

**SOLID WASTE PROGRAM
INTERNAL ROUTING SLIP**

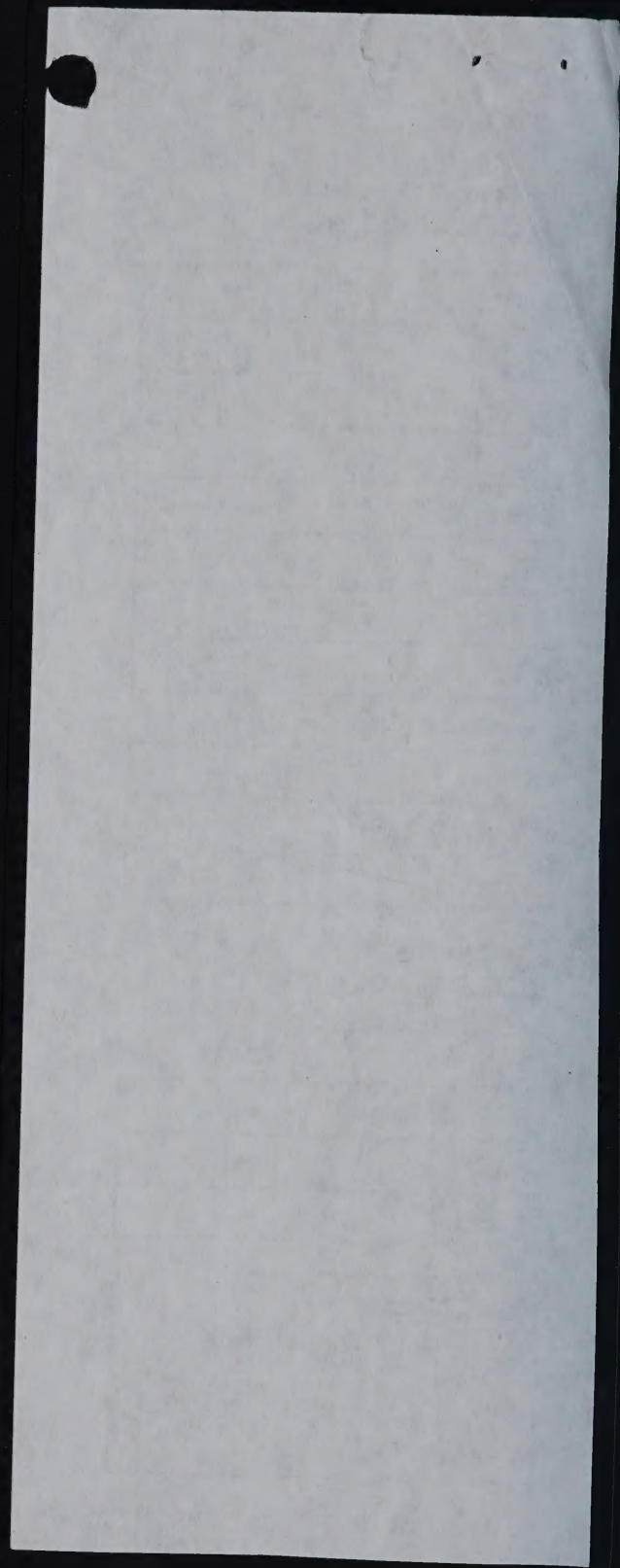
NAME	DATE
Jon Dilliard	10/11/22/98
F. (Pat) Crowley	
Rick Thompson	
Ken Kapsi	
Pat Potts	
Carol Utick	
Cathy Rudolf	
Mark Smith (Steger)	11/18/98
Nancy Davis	
Vacant Lic.	
Vacant Reg.	

**JUNK VEHICLE
INTERNAL ROUTING SLIP**

NAME	DATE
Darrell Stankey	
Bruce Meyer	
Vacant	

MISC / NOTES:

File: Helena
CMA and
METHANE.





Hydrometrics, Inc.

consulting scientists, engineers & contractors

2727 Airport Road
Helena, MT 59601
(406) 443-4150
Fax: (406) 443-4155 or
(406) 443-1252
www.hydrometrics.com

November 9, 1998

RECEIVED

NOV 10 1998

Kim Milburn
Public Works Director
City of Helena
316 North Park Ave.
Helena, MT 59623

MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

Dear Kim:

This letter is to transmit the minutes of the October 28, 1998 meeting between the City of Helena and the Montana Department of Environmental Quality (MDEQ) in regards to the City of Helena landfill methane and groundwater remediation.

Attending: Kim Milburn, City of Helena
Janet Pallister, City of Helena
Shelly Laine, City of Helena
Larry Kurokawa, City of Helena
Rich Lynd, City of Helena
Pat Crowley, MDEQ
Bill Thompson, Hydrometrics
Mike Wignot, Hydrometrics
Jodi Bingham, Hydrometrics

EXISTING YMCA GAS EXTRACTION SYSTEM

- Jodi Bingham gave an update of the existing YMCA gas extraction system.
 - Hydrometrics is currently optimizing flows in gas extraction wells EW-3, EW-4 and EW-5 to try to reduce methane levels to below the LEL (5% methane) in monitoring probes HL-9 and HL-10.
 - Methane levels in probe HL-18 have been below the LEL for the last month.
 - Methane levels in HL-10 recently dropped below the LEL for several days but have since drifted back up above the LEL. Maintaining levels below the LEL in HL-10 should be achievable through extraction well flow optimization.
 - Decreases in the methane levels in HL-9 have been seen, but levels have not yet dropped below the LEL.

- Pat Crowley discussed the results of his search for the exact compliance boundary at the YMCA.
 - Phase I of the old landfill was never licensed by the State of Montana. Records only mention the lease from Burlington Northern for Phase II in the State license.
 - Pat is content with the current monitoring of the existing extraction system monitoring probes and suggested that the continuation of current efforts to protect the YMCA is sufficient to meet the requirements of the State.

PROPOSED CARROLL COLLEGE GAS EXTRACTION SYSTEM

- Kim Milburn indicated that the City has been working with Carroll College to try to resolve their differences. Negotiations are continuing.
- It is Kim's goal to start the system design in January of 1999 and complete construction during this fiscal year.
- Kim indicated that the landfill is one of his top three priorities.

GROUNDWATER REMEDIATION

- Alternatives for groundwater remediation included existing corrective measures, air sparging and groundwater extraction.

Existing Corrective Measures

- Jodi Bingham presented evidence of significant improvements in the groundwater quality since the implementation of the existing corrective measures.
- The aerial extent of the PCE plume, the only VOC above the MCL (5 ppb) at the compliance boundary, does not appear to be increasing significantly with time and concentrations are generally decreasing.
- Concentrations of PCE are still increasing in downgradient well 5 (up to 2.7 ppb), but this is expected due to the time required for groundwater and subsequent contamination to travel from the landfill to well 5. This and other private wells north of Custer Avenue will be monitored closely and carbon canisters or city water will be supplied to those homes deemed to be at risk of exceeding the MCL.

Air Sparging

- Jodi Bingham presented information concerning air sparging as a possible groundwater remediation alternative.
- Although the contaminants themselves are very volatile and would be amenable to sparging, well logs indicate the geology on the north edge of the landfill is highly variable with layers containing a high percentage of fines (low permeability). As air sparging is particularly sensitive to soil heterogeneity (overlying layers of lower permeability), the effectiveness of an air sparging system is questionable.
- It is apparent that any design would be highly dependent upon field conditions.

Groundwater Extraction

- Bill Thompson presented the results of his groundwater model of the Helena landfill and affected downgradient areas.
- The model was able to duplicate the existing potentiometric surface with the exception of a few points (beneath the MPC building and I-1). The east/west path of the water particles is particularly sensitive to the amount of recharge added at the storm drain outfall.
- From the model, it would appear that the golf course irrigation wells are already capturing the eastern half of the plume and are responsible for the improved groundwater quality downgradient of these wells.
- A combination of three pumping wells on the northwest boundary of the landfill (pumping ~20 gpm) and one pumping well on the northeast boundary of the landfill (pumping ~5 gpm) are sufficient to capture all particles leaving the landfill when pumped continuously.
- When this same combination of wells is pumped 180 days of the year, approximately 75% of the water particles are captured with the majority of the remaining particles headed for I-4. It is expected that with the increased mixing and aeration caused by the seasonal pumping, compliance could be achieved in wells MPC-1 and HL-90-1 pumping only 6 months of the year.
- A phased approach was recommended beginning with the seasonal pumping of the four proposed pumping wells. Several additional scenarios could be implemented secondarily if required to achieve compliance.
- Mike Wignot inquired as to whether just extracting the west half of the plume would be sufficient since the golf course irrigation wells already catch the eastern half. Pat Crowley indicated that in order to achieve compliance in HL-90-1, he would prefer to pump the three wells upgradient of the compliance well.

Bill Thompson indicated that the proposed pumping wells may have an effect on the capacity of the golf course irrigation wells; however, it is expected that these effects would be minimal and Rich Lynd of the City of Helena concurred.

Air Sparging

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- Although the contaminants themselves are very volatile and would be amenable to sparging, well logs indicate the geology on the north edge of the landfill is highly variable with layers containing a high percentage of fines (low permeability). As air sparging is particularly sensitive to soil heterogeneity (overlying layers of lower permeability), the effectiveness of an air sparging system is questionable.
- It is apparent that any design would be highly dependent upon field conditions.

Groundwater Extraction

- Bill Thompson presented the results of his groundwater model of the Helson landfill and related groundwater issues.
- The model was able to duplicate the existing potentiometric surface with the exception of a few points (mostly the MFC building and I-1). The southwest path of the water particle is particularly sensitive to the amount of recharge added at the storm drain outlet.
- From the model it would appear that the golf course irrigation wells are already capturing the eastern half of the plume and are responsible for the improved groundwater quality downgradient of these wells.
- A combination of three pumping wells on the northwest boundary of the landfill (pumping -20 gpm) and one pumping well on the northeast boundary of the landfill (pumping -2 gpm) are sufficient to capture all particles leaving the landfill when pumped continuously.
- When the same combination of wells is pumped 180 days of the year, approximately 15% of the water particles are captured with the majority of the remaining particles located in I-1. It is expected that with the increased mixing and aeration caused by the seasonal pumping, compliance could be achieved in wells MFC-1 and HL-00-1 by pumping only 6 months of the year.
- A phased approach was recommended beginning with the seasonal pumping of the four proposed pumping wells. Several additional scenarios could be implemented accordingly if required to achieve compliance.
- Mike Wright inquired as to whether just extending the west half of the plume would be sufficient since the golf course irrigation wells already catch the eastern half. Pat Crowley indicated that in order to achieve compliance in HL-00-1, he would prefer to pump the three wells upstream of the compliance well.

Bill Thompson indicated that the proposed pumping wells may have an effect on the capacity of the golf course irrigation wells; however, it is expected that these effects would be minimal and Rich I and of the City of Helson concurred.

Kim Milburn
November 9 1998
Page 4

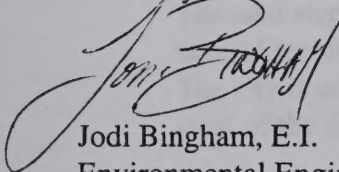
- Rich Lynd also questioned the effects of the City installing irrigation wells in Northwest Park south of Capital High School. It was agreed that this could speed the remediation of the northwestern portion of the plume but would not affect the design of the pumping system.
- Pat Crowley indicated that he thought this approach to groundwater remediation was heading in the right direction and the model was money well spent.

SCHEDULE

- For the Carroll College gas extraction system, the property issues will be settled as soon as possible with the intention to complete the design this winter and construction by next summer.
- For the groundwater remediation, the next step includes a meeting with the City Commission to present the alternatives, discuss the fiscal implications, and select a remedial alternative. As the commission has a full calendar, the schedule will be determined by the first available opening. Pat Crowley will check with the MDEQ legal department to determine the appropriate documentation required to comply with the Corrective Measures Assessment and to see if another public meeting needs to be held. After the City agrees on the new remedial alternative, Hydrometrics will prepare a report with the preferred alternative and a concrete plan for implementation. This plan will then be presented to MDEQ for review and approval. Final design and construction will follow MDEQ approval.

If you have any questions or comments concerning this summary, please feel free to call me.

Sincerely,



Jodi Bingham, E.I.
Environmental Engineer/Chemist

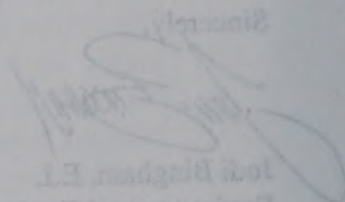
c: Ted Hill, City of Helena
Janet Pallister, City of Helena
Shelly Laine, City of Helena
Larry Kurokawa, City of Helena
Rich Lynd, City of Helena
Pat Crowley, MDEQ
Bill Thompson, Hydrometrics
Mike Wignot, Hydrometrics

- * Rich Lynd also questioned the effects of the City installing irrigation wells in Northwest Park south of Capital High School. It was agreed that this could affect the remediation of the northwestern portion of the plume but would not affect the design of the pumping system.
- * Pat Crowley indicated that he thought this approach to groundwater remediation was sound in the light of the fact that the model was money well spent.

SCHEDULE

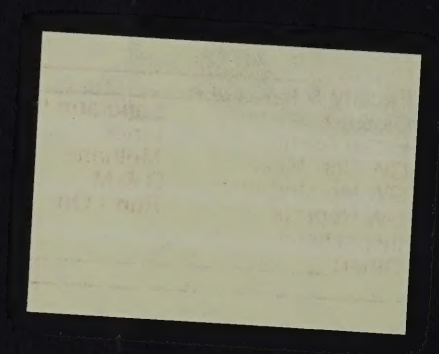
- * For the Carroll College gas extraction system, the property issues will be settled as soon as possible with the intention to complete the design this winter and construction by next summer.
- * For the groundwater remediation, the next step includes a meeting with the City Commission to present the alternatives, discuss the fiscal implications, and select a remedial alternative. As the commission has a full calendar, the schedule will be determined by the first available opening. Pat Crowley will check with the MDEQ legal department to determine the appropriate documentation required to comply with the Corrective Action Agreement and to see if another public meeting needs to be held. After the City agrees on the new remedial alternative, Hydrochemics will prepare a report with the preferred alternative and a concrete plan for implementation. This plan will then be presented to MDEQ for review and approval. Final design and construction will follow MDEQ approval.

If you have any questions or comments concerning this summary, please feel free to call me.

Sincerely,

John Bligham, E.I.
Environmental Engineer/Manager

cc: Ted Hill, City of Helena
Janet Pollard, City of Helena
Shelly Lane, City of Helena
Larry Kunkaw, City of Helena
Rich Lynd, City of Helena
Pat Crowley, MDEQ
Bill Thompson, Hydrochemics
Mike Wignat, Hydrochemics

County	L & C
Facility & #	Helena 70
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other:	Corrective Measure Assessment





City of Helena

316 N. Park Avenue

Helena, Montana 59623

RECEIVED

APR 01 1998

MONTANA

DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

File: Helena
1. A.

1) Methane

2) Corr. Measures

3) Admin.
Order.
(new)

March 30, 1998

Mr. Pat Crowley

MDEQ - Permitting and Compliance Division

Community Services Bureau

P.O. Box 200901

Helena, MT 59620

Dear Pat,

This letter has been prepared in response to your letter of March 12, 1998, regarding Financial Assurance for Corrective Measures, and to other concerns which you mentioned in our meeting last Wednesday. In our meeting, we agreed to the following:

- The City will submit a corrective measures cost estimate and financial assurance information, which will include cost for a landfill gas extraction system covering the entire landfill. This estimate and financial assurance information will be available at our first Wednesday meeting (April 1, 1998 at 9:00 a.m.).
- Final design, and determination of the size and location of further gas extraction is dependent on testing of the Phase I system, which should be operational in the next week. A two month testing phase has been proposed. After this testing period, the city proposes a meeting to discuss the scope and timeline for further design and implementation of gas extraction.
- The City will continue working on a technical and political resolution to methane migration and land-ownership issues on Carroll College property west of the landfill. The next step in this issue will be the presentation of construction cost estimates for several technical options at our meeting scheduled for Wednesday, April 1, 1998. The city is committed to implementing mitigative measures for methane migration west of the fill area during 1998.

In regard to the financial assurance cost estimates required by MDEQ. Initial cost estimates, which the city believed covered environmental monitoring, post-closure care, and corrective measures selected was submitted to MDEQ in Spring of 1997. The MDEQ responded to this submittal in a two letters dated November 7 and 10, 1998. The first of these letters requested additional information on environmental monitoring costs, which were submitted by the City. As your letter stated, costs for corrective measures are to be submitted within 120 days of

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selecting a remedy. At no time has the City considered anything past the Phase I system which is installed at the YMCA, a **selected** remedy.

As no further remedy has been "selected," the City does not consider themselves to be negligent in providing the department financial assurance information. However, the City has agreed to provide you the enclosed financial assurance information to provide the Department with assurance that the City is able to finance a "full-scale" gas extraction system if necessary. This cost estimate is assumed to include adequate cost to globally encompass the Phase I system installed; mitigation of methane migration to near Carroll College, which we are committed to, and any additional gas extraction which may be required to control migration and/or address groundwater concerns.

A global gas extraction system addressing all of the landfill (Phase I, II and III) is well beyond the scope of gas extraction discussed in the corrective measures study. The City does recognize that MDEQ considers the Phase I system too small to adequately address groundwater concerns at the site. However, the two month test period will allow us to determine the area of landfill which will be influenced by the system and make decisions regarding the scope of further corrective actions.

I would also like to comment regarding your assertion during our meeting that the City has ignored methane migration from the west edge of the fill area. While it is true that the City realizes that migration in this area has occurred for some time, we have discussed the issue numerous times with MDEQ. Because of the apparent barrier to significant migration and the distance to buildings on this side of the landfill, it has been the City's position, and we thought MDEQ's that this area would be addressed after the Phase I work is completed, in recognition of fiscal concerns. With Carroll's desire to do construction in this area, we realize that it is important to now make this mitigation system a priority, which is why we have performed the investigation of methane migration and fill depth in this area and developed potential mitigation alternatives.

With regard to the corrective measures for groundwater, we maintain a position that the City has developed the appropriate response, considering the scope of the problem. While it is apparent that the landfill has contributed constituents to groundwater in the area, it is important to consider the scope of the problem and potential for risk to human health and the environment, in developing corrective alternatives. The department's regulations ARM 17.50.710 states the department may determine that remediation of groundwater is not necessary:

- If the constituent(s) present in ground water is not currently or reasonably expected to be a source of drinking water: and is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the ground water protection standards..., or

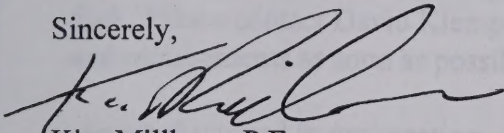
- If the ground water is additionally contaminated by substances that have originated from another source other than (the landfill) and those substances are present in concentrations such that cleanup of the release from the disposal unit would provide no significant reduction in risk to actual or potential receptors.

Owners in the area in which the groundwater plume extends at concentrations exceeding the groundwater protection standards are prohibited by statute from installing wells for potable use. Years of data have shown that the constituents attributable to the landfill present in groundwater are not likely to migrate to any area used as drinking water at a concentration exceeding the ground water protection standards. Past data also show the tetrachloroethylene concentrations in groundwater from other nearby source(s) are at levels which exceed the groundwater protection standard. In light of these issues we continue to maintain that any cleanup activities would not significantly reduce risk to human health or the environment (because little risk is present), and that the department has the responsibility to consider the cost versus benefit of any corrective measure.

We hope that the commitments which we have presented in this letter and in our meeting last week are consistent with what we discussed. We look forward to meeting with you this week and working together to provide the best resolution of your concerns.

Please call if you have any questions or need further information.

Sincerely,



Kim Millburn, P.E.
Public Works Manager

- c: Mr. Ted Hill, City of Helena Environmental Engineer
Steve Downs, Hydrometrics
Dennis M. Taylor, City Manager
David Nielsen, City Attorney
Shelly Laine, Administrative Services Director

If the ground water is additionally contaminated by substances that have originated from another source other than (the landfill) and these substances are present in concentrations such that cleanup of the release from the disposal unit would provide no significant reduction in risk to human or potential receptors.

Consistent with the goal in which the groundwater plume extends at concentrations exceeding the groundwater protection standards are prohibited by statute from installing wells for potable use. Years of data have shown that the concentrations attributable to the landfill present in groundwater are not likely to increase to any such level as drinking water at a concentration exceeding the ground water protection standards. Past data also show the relationship between concentrations in groundwater from other nearby sources) are at levels which exceed the groundwater protection standards. In light of these issues we continue to maintain that any cleanup activities would not significantly reduce risk to human health or the environment (because this risk is present) and that the department has the responsibility to consider the cost versus benefit of any corrective measures.

We hope that the commitments which we have presented in this letter and in our meeting last week are consistent with what we discussed. We look forward to meeting with you this week and working together to provide the best resolution of your concerns.

Please call if you have any questions or need further information.


Kim Williams, P.E.
Public Works Manager

cc: Mr. Ted Hill, City of Salem Environmental Engineer
Steve Lamm, Hydrologist
Thomas M. Taylor, City Manager
David Nichols, City Attorney
Sally Laine, Administrative Services Director

County	<u>Lewis & Clark</u>
Facility & #	<u>Helena 90</u>
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other:	<u>Remediation Measures</u>
	<u>Assessment</u>

2-5

County _____
Activity & _____
Closing _____
Finnish Area _____
Mentor _____
OW Con Meet _____
OW Monitoring _____
OW Reports _____
Inspection _____
Other: _____

DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING & COMPLIANCE DIVISION
WASTE MANAGEMENT SECTION

MARC RACICOT, GOVERNOR

Metcalf Building



STATE OF MONTANA

Phone: (406)444-4400
Fax: (406)444-1374

PO Box 200901
Helena, MT 59620-0901

August 4, 1997

Kim Milburn
Director of Public Works
City of Helena
316 North Park Avenue
Helena, MT 59623

Dear Kim:

Please proceed with Phases 1 and 2 of the Helena Landfill Gas Extraction Plan. This needs to be implemented as soon as possible, with the bid advertisement no later than August 15, 1997. Gas extraction must commence prior to December 31, 1997. An air quality permit may be needed for the discharge of gas to the atmosphere, the operation of a flare, or the use of landfill gas as boiler fuel. Please contact David Klemp of the Air and Hazardous Waste Bureau for permit conditions and requirements as soon as possible.

As we discussed in our meeting, the layout of the gas extraction system for the rest of the landfill should be coordinated with the park design. Evaluation of the gas production potential, re-design of the methane monitoring systems, investigations of the waste boundaries, and negotiations on land exchanges should proceed in a timely fashion. Areas that need particular emphasis, as we discussed, are the western edge of the landfill near Carroll College and the last area of waste deposition between the railroad tracks. All studies need to be presented to the Department as they are completed so we properly evaluate the proposed designs. We anticipate working closely with you and your consultants to provide appropriate advice and timely permit coordination.

While coordination with the park design is important, construction should not be delayed by the park plans, however. A design for the extraction system must be presented to the Department no later than April 1, 1998 and construction of the extraction system completed by October 1, 1998. This will allow the City to spread the cost over two fiscal years while maintaining a timely corrective action schedule. We understand that the City may not have sufficient funds for all of the recreation facility prior to the needed installation of the environmental protection systems, but the base grading, piping, and extraction systems should be installed prior to top dressing, surface facility construction, and grassing, in any event.

Kim Milburn
Page 2
August 4, 1997

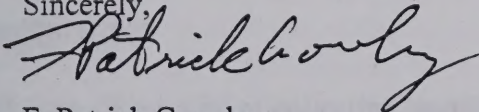
From the commencement of gas extraction, no later than October 1, 1998, the City will have two years to demonstrate the effectiveness of the gas extraction system as a remediation for the ground water contamination. This is consistent with what the Department has allowed other landfills in similar situations. If effectiveness with the ground water protection is not established by that time, the City may need to implement additional corrective measures.

I hope that this letter expresses our mutual agreement, based on our discussion of July 29, 1997. While specific deadlines were not discussed at the meeting, the dates in this letter are consistent with our discussions and are needed as "bright lines" for all of us. The Department's Enforcement Division monitors compliance activities to insure that we are providing timely, consistent activities throughout the Department and is tracking our performance on this action. The Waste Management Section staff will commit to timely plan reviews so that these deadlines can be achieved. We will have preliminary comments available within two weeks of any plan presentation to identify any fatal flaws or major obstacles.

You might contact Karen Fink of the City of Bozeman's Engineering Department (406-582-2382) about possible bidders as they have recently let a contract for their gas extraction system. We also have a copy of SWANA's Master Construction Specifications for Landfill Gas Conveyance Systems that we use as a reference when reviewing bid specs. We can lend you a copy if you need one.

Thank you for meeting with us. If you have any further questions on this matter, please feel free to contact me. My direct phone line is 406-444-5294.

Sincerely,



F. Patrick Crowley
Acting Section Head

cc: Jon Dilliard, DEQ
Jan Sensibaugh, DEQ
Troy McGee, Acting City Manager
Ted Hill, City Engineer
Carol Kirkland, Helena Parks Department
Steve Downs, Hydrometrics
Carl Thuesen, P.O. Box 22943, Billings, MT 59104

File:Helena Landfill\corrective measures and methane files

County	<u>Lucas & Clark</u>
Facility & #	<u>Kilena 90</u>
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other	<u>Connection Measures</u>
	<u>Assessment</u>
<u>2-5</u>	

County
Cash & W.
Chas. A. W.
Finn A. W.
G.W. Con. Mass.
G.W. Monahan
G & M
Lou G. N.
Lambert
Line
Mollan
Other:
Inspection
GW Reports
GW Monahan
GW Con. Mass.
Finn A. W.
Chas. A. W.
Cash & W.
County



City of Helena
316 N. Park Avenue
Helena, Montana 59623

Helena CMA
Methane

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JUL 03 1997

MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

July 1, 1997

Mr. Pat Crowley
Montana Department of
Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Dear Mr. Crowley:

This letter is in response to comments in your June 17, 1997 letter addressed to Ted Hill. Each of your comments has been reiterated in this letter followed by our response.

MDEQ COMMENT:

1) Landfill gas extraction was chosen as the preferred alternative in the Ground Water Corrective Measures Assessment (CMA). The system proposed in that document had a much larger areal extent than the current design. The current design will be unable to achieve the ground water protection desired because it does not extract gas from enough of the landfill. The extraction system ends far short of the most significantly impacted well (EPA - 1) and does not extend into the plume of ground water contamination. The minimum acceptable size for the system is as depicted on figure 3-1, of the February 1996 Addendum to the CMA.

RESPONSE:

The whole premise of collecting landfill gas to improve water quality is predicated upon the model that the landfill gas migrates away from the area in which it is generated, cools, and condenses on the water table and contaminates the groundwater. In order to be effective, the gas extraction system must collect the gas in the vadose zone near the source area, before it has a chance to migrate, cool and condense. While a vapor extraction system may be minimally effective in volatilizing these constituents from the dissolved phase as your comment suggests, extending the system to the apparent groundwater plume area would have minimal additional benefit if there is little gas available, or if the proposed system impacts the area already.

Based on Gas Control Engineering's extensive work on gas extraction systems, it is not unusual for extraction wells placed in waste to collect gas up to 600 feet away. While this may be optimistic in a shallow landfill such as the Helena landfill, the proposed gas extraction system will affect the majority of the Centennial Park area. The landfill gas system depicted in the Corrective Measures Assessment was conceptual only and based on relatively limited data. Methane monitoring in the past two years has

Comments to your June 17, 1990
letter received followed by our

not indicated that a significant amount of gas is generated in the area around EPA-1. In fact no significant quantities of gas have been measured at EPA-1 or the two closest methane probes on the east edge of Centennial Park.

Page 3-3 of the Addendum to the Corrective Measures Assessment (CMA) states that "the actual location (spacing) of extraction wells, number of wells, and location of the treatment system will be presented when final design has been completed". Extending the extraction system to the very edges of the landfill as shown in conceptual form in the CMA would likely result in the recovery of little additional gas and may pose additional problems by inducing fresh air into the landfill.

It is not known exactly where the gas affecting water quality at EPA-1 originates, but monitoring data to date suggests that the highest concentrations of gas are located in the area addressed by the proposed extraction system. Because of concern in the park area near EPA-1, the Phase I design does include the installation of three extraction wells extending to this area. These wells will be installed as part of the Phase I construction. If monitoring of these wells suggests that significant quantities of gas exist in this area (and the Phase I system does not adequately influence this area), these wells can quickly be manifolded to the extraction system. However, the addition of these wells to the system (requiring significant disturbance of the landfill cap and park facility) without demonstrating that there is significant uncontrolled landfill gas in the area is not warranted.

In addition, the City feels that MDEQ should better consider the scope of the groundwater problem at the site. The amount of groundwater remediation necessary to achieve compliance is minimal. If you recall, only one constituent attributable to the landfill exceeds the groundwater standards required by MDEQ. This constituent (tetrachloroethene) is present north of the landfill at the compliance well (HL-90-1) at a level only slightly above the groundwater standard. Also as demonstrated by the CMA, there is little or no risk to the public or environment from groundwater contamination at the landfill. Tetrachloroethene levels exceeding the groundwater standard have never been detected in potable water sources downgradient from the landfill.

The vast majority of risk associated with the landfill is the potential for accumulation of landfill gas in nearby buildings and combustion or explosion of the gas. The proposed system addresses this risk, with the added benefit of groundwater remediation. Only a small improvement of water quality provided by the gas extraction system may result in compliance with water quality regulations.

MDEQ COMMENT:

2) No emissions estimate was provided for Phase 1 testing. It is impossible to determine if this unflared discharge to the atmosphere is permissible without pumping rates or non-methane organic compound (NMOC) concentrations. If

actual NMOC numbers were not obtained during last fall's testing, then EPA default numbers for landfill gas must be used to determine the pollutant discharge rate. If more than 25 tons of uncontrolled NMOCs will be discharged from the system on an annual basis, then an air quality permit is required and a best available control technology analysis completed to determine if the

proposed absorption canister would be acceptable.

RESPONSE:

This comment only pertains to those landfills subject to the new source performance standards with a design capacity of more than 2.5 million cubic meters. Based on the available data and extremely liberal estimates for depth of waste, no more than 1.98 million cubic meters of waste are landfilled at the Helena Landfill. Estimates based on actual waste weights recorded at the scale house are considerably less. This issue has been discussed with the air quality staff at MDEQ, and a design capacity report is being prepared as required by the rule.

Although the landfill is not subject to the new source performance standards, the air quality staff at MDEQ has asked that the city obtain an air quality permit for the emission from the gas extraction system. NMOC data were obtained during the pilot test and will be used in the preparation of the permit. As discussed in the design submittal letter, air-quality permit personnel at the MDEQ have indicated that the temporary carbon treatment of NMOC's and direct venting of methane could be approved.

MDEQ COMMENT:

3) The schedule as presented does not comply with the schedule as presented to the public during the CMA process. The testing phase is too long. There is no justification presented for a delay of this magnitude. This design is already a year late based on the schedule presented to the public during the CMA process and approved by the department. According to ARM 17.50.511(1)(h)(iii) the City had 60 days to implement methane gas control measures after the detection above regulatory limits. Detection first occurred (after the effective date of the regulation, as the City has known for some time about gas problems at the landfill) September 20, 1994, nearly 3 years ago.

RESPONSE:

The testing phase does nothing to invalidate the effectiveness of the system. The system will be fully operational regardless of the length of this testing period, because the test concerns only treatment of the gas and not gas recovery. The purpose of this test is to gather data necessary to design the proper burner so that a beneficial use of the gas can be developed.

The city has already voluntarily implemented several gas control measures, including the extensive monitoring systems and the positive pressure system at the YMCA which has been operational since last year. It should be remembered that no regulatory concentrations of methane have been detected in this area. The facility's property boundary is located east of the YMCA and, while methane has been detected west of the YMCA, extensive monitoring of methane probes along the property boundary have not indicated that regulatory concentrations (100% of the lower explosive limit (LEL)) exist. In fact methane is rarely detected at all along the property boundary. In addition, concentrations of over 25% of the LEL have never been confirmed in any buildings.

proposed absorption cannot be acceptable.

RESPONSE

This comment only pertains to those landfill subjects to the new source performance standards with a design capacity of more than 2 million cubic meters. Based on the available data and extremely liberal estimates on depth of waste, no more than 1.98 million cubic meters of waste are landfilled at the Island Landfill. Estimates based on actual waste weights recorded at the scale house are considerably less. This issue has been discussed with the air quality staff at MDEQ, and a design capacity report is being prepared as required by the rule.

Although the landfill is not subject to the new source performance standards, the air quality staff at MDEQ has asked that the city obtain an air quality permit for the emission from the gas collection system. NMOC data were obtained during the pilot test and will be used in the preparation of the permit. As discussed in the design submitted letter, air quality permit personnel at the MDEQ have indicated that the temporary carbon treatment of NMOCs and direct venting of methane could be approved.

MDEQ COMMENT:

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RESPONSE

The testing phase does nothing to invalidate the effectiveness of the system. The system will be fully operational regardless of the length of this testing period, because the test concerns only treatment of the gas and not gas recovery. The purpose of this test is to gather data necessary to design the proper burner so that a beneficial use of the gas can be developed.

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The only area in which an LEL level of methane exists at the property boundary is in the western portion of the landfill near Carroll College. This issue was discussed in several meetings with MDEQ, and it is the City's understanding that MDEQ agreed that because of the bedrock barrier to methane migration in this area, there was little risk. It is our understanding that continued monitoring after the installation of controls in the YMCA area would be necessary to determine if any further action was warranted. The City and Carroll College are currently discussing the transfer of property affected by the City's historical landfill operations, and these discussions will also influence future activities in this area.

The City is currently evaluating the potential for landfill gas to affect proposed athletic field construction at Carroll College. This evaluation will likely involve the installation of additional methane probes along the western property boundary of the landfill or within Carroll's property just west of the landfill. This evaluation will give the City and MDEQ a better understanding of the nature of LFG migration in this area.

MDEQ COMMENT:

4) The testing performed last fall does not seem adequate for design purposes. To quote the conclusions section of test report: "The test well was not placed in typical refuse and therefore is not representative of future wells installed in refuse, especially in terms of radius of influence." No logs were provided for either the test well or the test probes. This may or may not be correct based on the thickness of the refuse. If this is insufficient to control gas migration and correct the ground water problems at the landfill, the density may have to increase or the system expanded.

RESPONSE:

While the test well was not installed in typical waste (it was installed in the old burning portion of the landfill), it did allow for evaluation of "worst case" design criteria. The test also provided valuable information on the quality of the gas, NMOC's and condensate quality. The test well was installed in its location because it was near the highest recorded methane levels and in an area where the testing would not interfere with activities at the YMCA. It was not known at that time that the burn dump extended to this area. This portion of the landfill consists of a soil-like fill composed of burned waste

which has decomposed into a silty matrix. This fill is likely much less permeable than most of the landfilled wastes. Because there is no information on how much area this portion of the landfill occupies, the design was intentionally very conservative, and the 100 foot spacing was chosen. Considering the close spacing of the wells and the pavement over much of the area in which the wells are installed, it is very unlikely that methane will migrate uncontrolled past the system and into the YMCA.

The City feels that it is prudent to begin with the Phase I installation as designed as soon as possible. It is agreed that if the migration of landfill gas cannot be controlled and groundwater problems persist at the landfill, that the system may need to be expanded.

With regards to your comments concerning closure activities of the landfill, the City submitted closure

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RESPONSE:

While the test well was not installed in typical waste (it was installed in the old parking portion of the landfill), it did allow for evaluation of "worst case" design criteria. The test also provided valuable information on the quality of the gas, NMOC's and condensate quality. The test well was installed in a location because it was near the highest recorded methane levels and in an area where the testing would not interfere with activities at the YMCA. It was not known at that time that the burn dump extended to this area. This portion of the landfill consists of a soil-like fill composed of burned waste.

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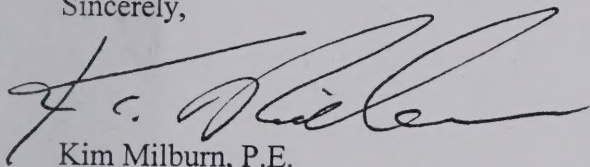
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quality assurance documentation in submittal dated April 7, 1997. This submittal was amended by additional financial assurance materials on May 5, 1997. This documentation was prepared by the City's engineering and administrative staff in response to previous correspondence as you referenced. It is our understanding that this submittal completes the closure activities at the landfill. The City has received no response from MDEQ regarding this submittal.

In closing, the City would like to express our concern that MDEQ's approach to this issue expressed in your June 17, 1997 letter, is contrary to the relationship which we have tried to develop during the past several years. While the City does acknowledge that the original "best guess" timeline on this project was unwittingly optimistic and has slipped we have worked continuously and diligently with MDEQ to come to what we believe is the appropriate and responsible solution for problems at our site. MDEQ was involved in preparing a Request for Proposals for the design of the landfill gas extraction system just last Fall. Numerous site visits by MDEQ personnel, as well as meetings and other correspondence, have kept MDEQ well apprised of the City's progress.

The City feels it would be appropriate to discuss these matters in person as soon as possible so that construction of the landfill gas extraction system can proceed. Please call and we will set up a meeting at your convenience.

Sincerely,



Kim Milburn, P.E.
City of Helena
Public Works Director

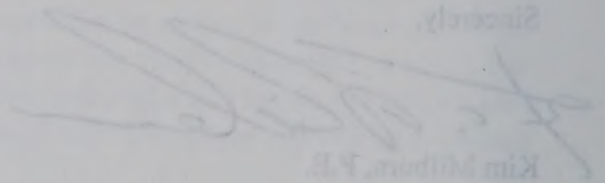
c: John Dilliard, MDEQ
Ted Hill, City of Helena
Steve Downs, Hydrometrics
Troy McGee, Acting City Manger

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In closing, the City would like to express our concern that MDEQ's approach to this issue expressed in your June 17, 1997 letter, is contrary to the relationship which we have tried to develop during the past several years. While the City does acknowledge that the original "best guess" timeline on this project was extremely optimistic and has slipped, we have worked continuously and diligently with MDEQ to come to what we believe is the appropriate and responsible solution for problems at our site. MDEQ was involved in preparing a Request for Proposal for the design of the landfill gas extraction system just last fall. Numerous site visits by MDEQ personnel, as well as meetings and other correspondence, have kept MDEQ well apprised of the City's progress.

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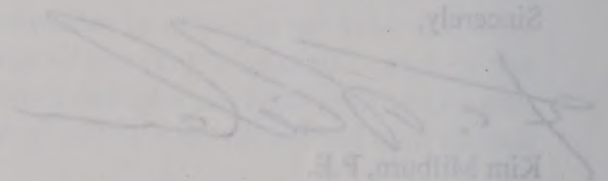
cc: John Dillard, MDEQ
Ted Hill, City of Helena
Steve Downe, H&B Associates
Troy McGee, Acting City Manager

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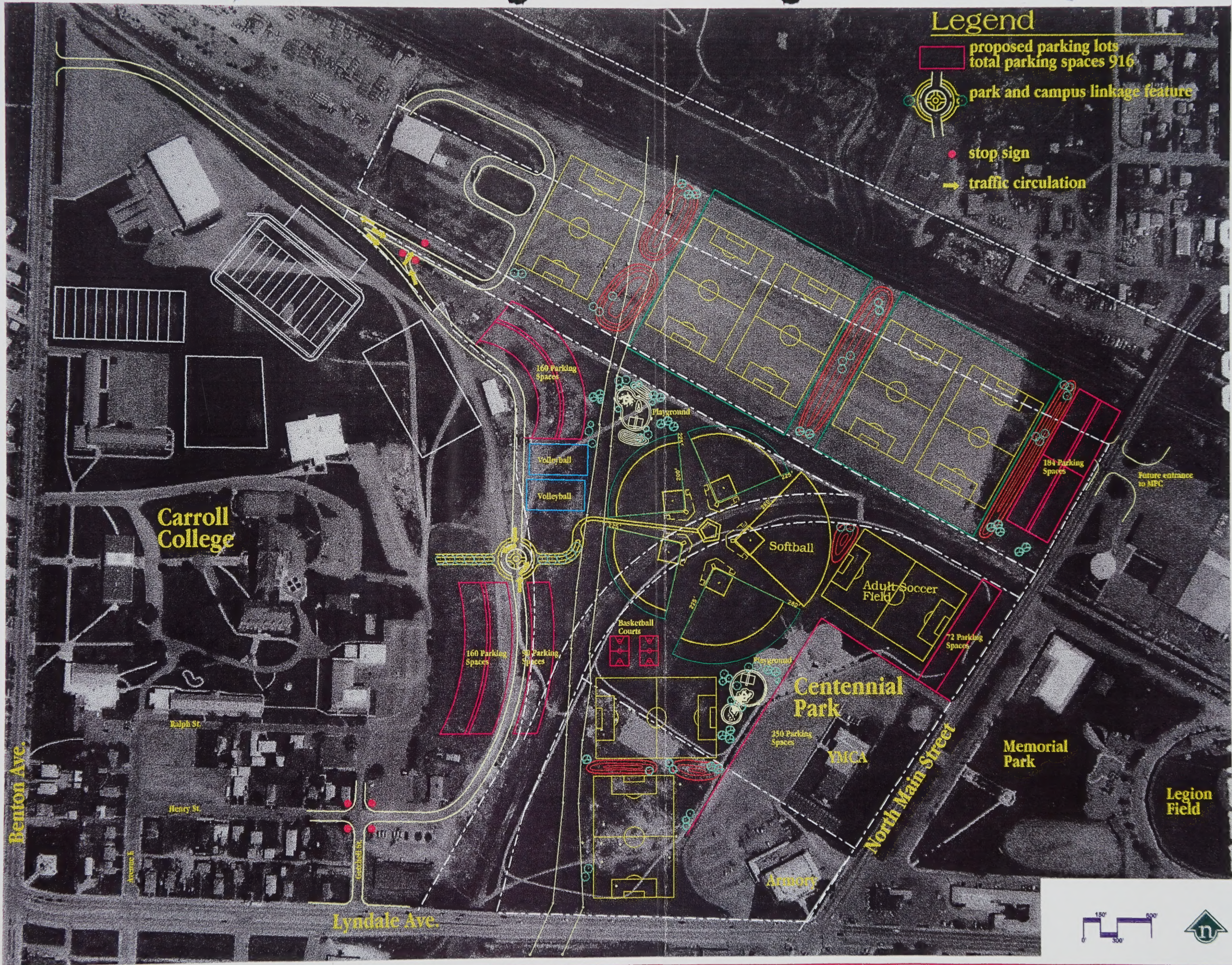
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Kim Millburn, P.E.
City of Helena
Public Works Director

John Dillard, MDEQ
Ted Hill, City of Helena
Steve Dorn, Hydromet
Troy McGee, Acting City Manager



This drawing is the property of the Landscape Architect. It has been prepared specifically for the site and is not to be used for any other purpose, location, or owner without written consent of the Landscape Architect.

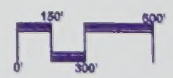
Centennial Park Master Plan Preliminary Master Plan

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1997
CARL THUESEN A.S.L.A.
GOLF COURSE ARCHITECTURE
LANDSCAPE ARCHITECTURE

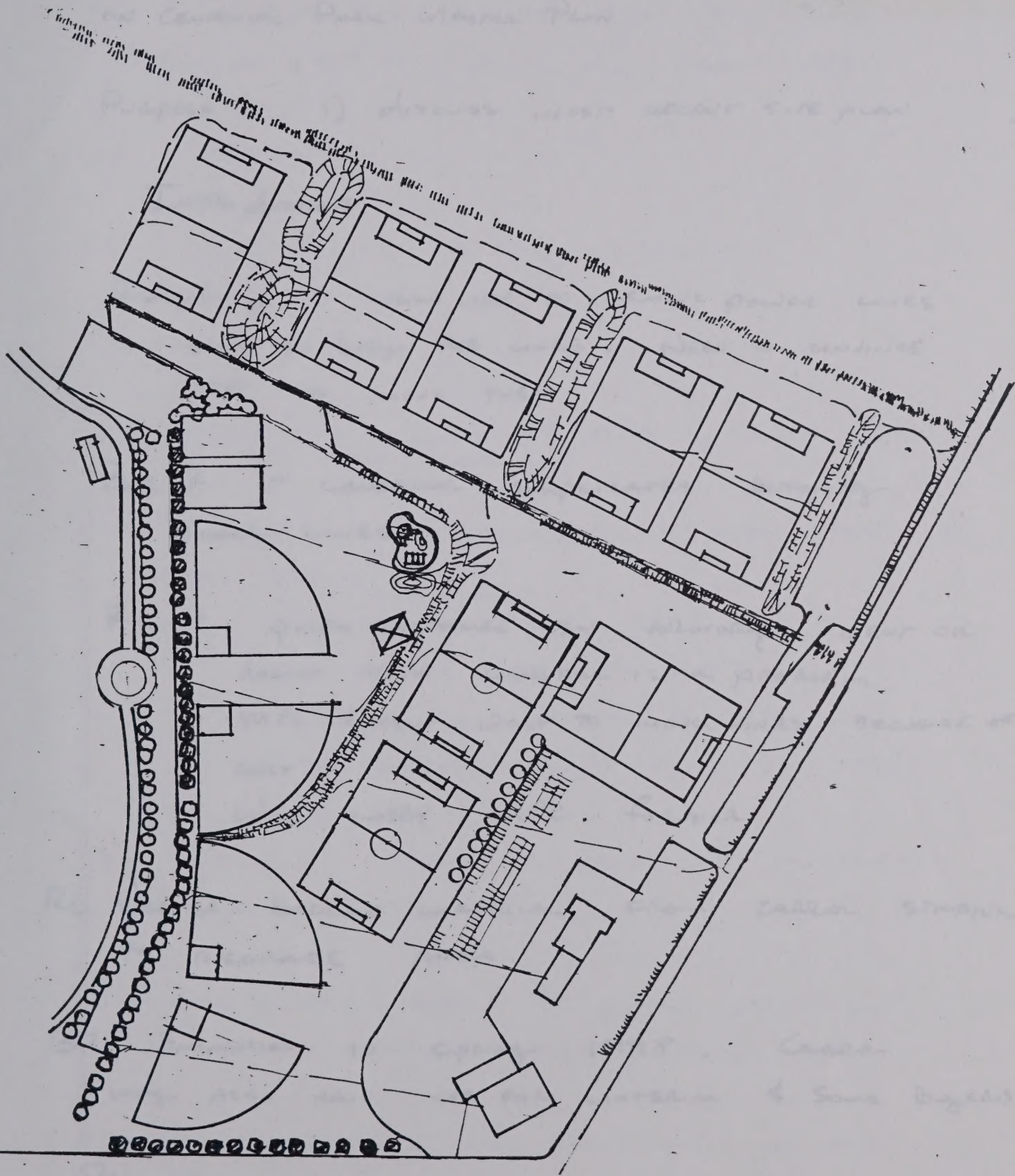
CARL THUESEN
A S L A
GOLF COURSE ARCHITECTURE
LANDSCAPE ARCHITECTURE
1800 GRAND AVE. SUITE 100
P.O. BOX 2284
BILINGS, MT 16004
406/223-4548 FAX 223-4557

Drawn by: GSG
Date: 3/25/97
Checked by: CAT
Date: 4/24/97
Rev: 5/1/97
Rev: 6/19/97
CADD File: SHEET 5
MSTR PLANDON

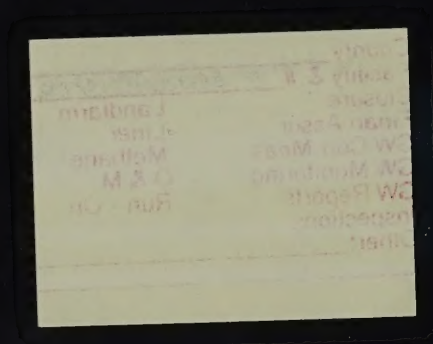
SHEET
5 OF 5



ALTERNATIVE LAYOUT FOR SOFTBALL FIELDS



County	Lewis + Clark
Facility & #	Helena 90
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other:	Corrosion Measures
	Assessment
2-5	



Meeting Mac Brier Center 9/11/97
ON CENTENNIAL PARK MASTER PLAN

Purpose 1) discuss most recent site plan

Introductory

Randy Line - would like to remove power lines
move or bury the lines. Need to convince
MPC to move them

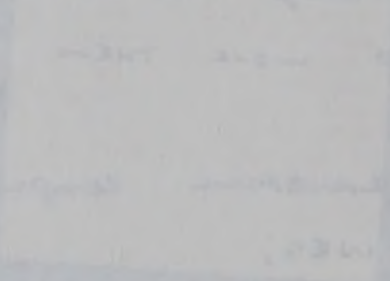
Bob R - Landfill complicates burying
power lines.

R.L. - poles installed by Armory went OK
don't think landfill is a problem
MPC doesn't want to move lines because of
cost
Will lobby MPC further

RL Use of borrow material from Carroll Stadium
to regrade area

BR Excavation in Spring 1998. Canal
may also have use for material & some buyers

RL East West spur



RL WOULD LIKE TO USE FILL TO REGRADE
SOCCER FIELD TO 28' FROM 49'

BR QUANTITIES

RL 75,000 yds OF FILL NECESSARY

Questions

- 1) SOUTH END WON'T BE FULLY GRADED YET
CAN'T TOUCH CAP.
- 2) Timing? Development OF BAN FIELDS &
SOCCER FIELDS
 - SOCCER FIELDS
 - SOFTBALL FIELDS REGRADE
 - REGRADE CENTENNIAL PARK10 years TOTAL TO DO ALL.
 - REGRADE SOUTH END OF PARK.
- 3) Restrooms? ON AN AREA NOT LANDFILLED
PREVIOUSLY
- 4) move public ROAD to public property
& LET CAROL MAKE PARKING LOT
- 5) All SOCCER & ALL BASEBALL IN ONE
LOCATION
(ST) OPTION IS BOTH IN ONE LOCATION

For whom this is the first to receive
the letter from the 23 Jan 11

By (Name)

For 23 Jan 11 to the recipient

Comments

1) This was sent to the recipient
on 23 Jan 11.

2) Timing: Delivery of the letter.

These files
- contain files
- separate tank in bank

10 days from the date
- separate bank and of bank

3) Location: in a safe not visible
personally

4) How many times to give property
it was given once during the

5) The source of the information in the
location
(for) report is not in the report

6) TOURNAMENT LEO BERRY WOULD LIKE
TOURNAMENTS TO COME HERE & BENEFIT
BUSINESS COMMUNITY

6-8 SOCCER FIELDS NEEDED FOR
STATE SOCCER TOURNAMENT.

20 FIELDS FOR REGIONAL TOURNAMENT, CARROLL
WOULD ALLOW THEIR FACILITIES TO BE USED.

HIGH SCHOOL NEEDS

AA - 4-5 FIELDS SOCCER & SOFTBALL
CURRENT LAYOUT OK.

NORTHWEST PARK - DOABLE PROJECT IN A
SHORT TIME

COMMUNITY RESPONSE

- YOUTH SOCCER FIELDS OK
- NO LIGHTS

DISCUSSION OF SOFTBALL FIELDS AND SOCCER FIELDS

7) LAYOUT OF NORTHWEST PARK TO REDUCE
IMPACT OF FANS

8) Wells for sports facilities?

- City attorney draft on wells for sports facilities

?? WHAT IF LEACHATE IS IN SPORTS FIELD H₂O?

- City water is expensive

9) Leo Barry - Would like entire complex to be soccer,

Airport Development

Water Federal Reserve well or at least?

2-8 fields would reduce use of Centennial park.

10) Focus on city tournaments, facilities serve community better.

Next mty

Rm 326 City County Bldg . 7:00pm 9/12/97

INITIALS DATE 6/12/97**SOLID WASTE OUTGOING CORRESPONDENCE ROUTE SLIP (ONLY)**☐ **NEW APPLICATION**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Cathy

Jon D.

☐ **NEW LICENSE**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **HEALTH OFFICER CARD**

Initial / Date

Rick T.

Carol

Cathy

☐ **INSPECTIONS**

Initial / Date

Pat C.

Nancy (Proof)

Carol

Jon D.

☐ **INTERIM CLOSURES**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **CLOSURES**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **CHANGE IN LICENSE
FOR FEE STATUS**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Cathy

☐ **COMPLAINTS**

Initial / Date

Pat C.

Nancy (Proof)

Carol (filing & DBase)

☐ **GROUND WATER**

Initial / Date

Nancy (Proof)

Pat C.

☒ **GENERAL CORRESPONDENCE**

Initial / Date

Pat C. / Rick T.

Nancy (Proof)

Jon D. (As Needed)

Mark Steger Smith (As Needed)

Jan Seuribangke

☐ **MISCELLANEOUS**

Initial / Date

☐ **FILE**

County	Lewis & Clark
Facility & #	Helena 90
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other:	Corrective Measures
	Assessment
	2-5

County of ...
Facility & ...
Closure
Final Asse
GW Cont M
Methane
O & M
Run - G
Inspection
Other:

DEPARTMENT OF ENVIRONMENTAL QUALITY

PERMITTING & COMPLIANCE DIVISION

SOLID WASTE PROGRAM

MARC RACICOT, GOVERNOR

Metcalf Building



STATE OF MONTANA

Phone: (406)444-4323

Fax: (406)444-1374

PO Box 200901

Helena, MT 59620-0901

June 17, 1997

Ted Hill
Environmental Engineer
City of Helena
316 North Park Avenue
Helena, MT 59623

Dear Ted:

I have reviewed the City of Helena Landfill Gas Extraction System - Phase 1. The plan as presented is unacceptable for the following reasons:

- 1) Landfill gas extraction was chosen as the preferred alternative in the Ground Water Corrective Measures Assessment (CMA). The system proposed in that document had a much larger areal extent than the current design. The current design will be unable to achieve the ground water protection desired because it does not extract gas from enough of the landfill. The extraction system ends far short of the most significantly impacted well (EPA - 1) and does not extend into the plume of ground water contamination. The minimum acceptable size for the system is as depicted on figure 3-1, of the February 1996 Addendum to the CMA.
- 2) No emissions estimate was provided for Phase 1 testing. It is impossible to determine if this unflared discharge to the atmosphere is permissible without pumping rates or non-methane organic compound (NMOC) concentrations. If actual NMOC numbers were not obtained during last fall's testing, then EPA default numbers for landfill gas must be used to determine the pollutant discharge rate. If more than 25 tons of uncontrolled NMOCs will be discharged from the system on an annual basis, then an air quality permit is required and a best available control technology analysis completed to determine if the proposed absorption canister would be acceptable.
- 3) The schedule as presented does not comply with the schedule as presented to the public during the CMA process. The testing phase is too long. There is no justification presented for a delay of this magnitude. This design is already a year late based on the schedule presented to the public during the CMA process and approved by the department. According to ARM 17.50.511(1)(h)(iii) the City had 60 days to implement methane gas control measures after the

Ted Hill

Page 2

June 17, 1997

detection above regulatory limits. Detection first occurred (after the effective date of the regulation, as the City has known for some time about gas problems at the landfill) September 20, 1994, nearly 3 years ago.

4) The testing performed last fall does not seem adequate for design purposes. To quote the conclusions section of test report: "The test well was not placed in typical refuse and therefore is not representative of future wells installed in refuse, especially in terms of radius of influence." No logs were provided for either the test well or the test probes. The proposed radius of influence for the extraction wells seems arbitrarily set at 100 feet. This may or may not be correct based on the thickness of the refuse. If this is insufficient to control gas migration and correct the ground water problems at the landfill, the density may have to increase or the system expanded.

In addition to the gas and ground water contamination at the landfill, the City has not completed closure of the landfill. This has been the topic of several previous letters and meetings. According to ARM 17.50.530(1):

(g) The owner or operator of all Class II landfill units must complete closure activities of each Class II unit in accordance with the closure plan **within 180 days** following the beginning of closure as specified in (1)(f) of this rule. Extensions of the closure period may be granted by the department if the owner or operator demonstrates that closure will, of necessity, take longer than 180 days **and he has taken and will continue to take** all steps to prevent threats to human health and the environment from the unclosed Class II landfill unit. (Emphasis added.)

- Without the installation of the gas system to implement the CMA, the Department cannot grant any time extension on the landfill closure. If the City wishes to change the end use from what was approved, then approval for the changes must be obtained from the Department. Our primary concerns are the protection of the infiltration layer and the prevention of over watering either of which could increase infiltration into the landfill and exacerbate the current gas and ground water pollution problems. The final surface design should take into account the probable necessity for a gas extraction system in the final phase of the landfill.

The City is therefore required to:

- 1) Submit a revision to page 1 of the methane extraction system design that meets, at a minimum, the design proposed in the CMA to the Department within 14 days of the date of this letter.
- 2) Implement the design within 60 days of the date of this letter as required by ARM 17.50.511(1)(h)(iii).

detention above regulatory limits. Detention time occurred (after the effective date of the regulation, as the City has known for some time about gas problems at the landfill) September 24, 1994, nearly 3 years ago.

4) The existing performance test (EPT) does not seem adequate for design purposes. To quote the Commission's review of the EPT: "The test itself was not placed in typical refuse and therefore is not representative of refuse waste collected in refuse, especially in terms of volume of influence." The EPT was provided for other the test as the test. The proposed action of the EPT is the extraction wells seems extremely set as 100 feet. This may or may not be correct based on the thickness of the refuse. If this is insufficient to control gas migration and control the ground water problems at the landfill, the density may have to increase or the system corrected.

In addition to the gas and ground water contamination at the landfill, the City has not completed cleanup of the landfill. This has been the topic of several previous letters and meetings. According to ARM 17.30.211(1)(b):

1) The owner or operator of all Class II landfills shall complete cleanup activities of each Class II unit in accordance with the cleanup plan within 180 days following the beginning of cleanup as specified in (1)(b) of this rule. Extension of the cleanup period may be granted by the Department if the owner or operator demonstrates that cleanup will, of necessity, take longer than 180 days and he has taken and will continue to take all steps to prevent threats to human health and the environment from the regulated Class II landfill unit. (Typographic added)

Without the installation of the gas system to regulate the CMA, the Department cannot grant any time extension on the landfill cleanup. If the City wishes to change the and the time what was approved, then approval for the change must be obtained from the Department. Our primary concern is the protection of the population layer and the prevention of over-saturation of which would increase contamination and the landfill and eventually the current gas and ground water pollution problems. The final cleanup design should take into account the probable necessity for a gas extraction system in the final phase of the landfill.

The City is therefore requested to:

- 1) Submit a revision to page 1 of the methane extraction system design that meets, as a minimum, the design request to the CMA as the Department within 14 days of the date of this letter.
- 2) Implement the design within 60 days of the date of this letter as requested by ARM 17.30.211(1)(b)(ii).

Ted Hill

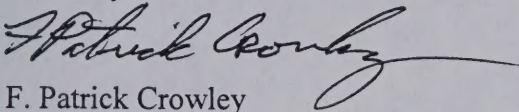
Page 3

June 17, 1997

3) Complete the closure of the landfill and submit the appropriate construction quality assurance documentation to the Department. If the city wishes to change the end use at a later time, then the Department will provide a prompt review of the proposed changes. In the mean time, we must be assured that the cap was properly constructed and the infiltration barrier is protected from weathering effects.

If you have any further questions on this matter, please feel free to contact me. My direct phone line is 406-444-5294.

Sincerely,



F. Patrick Crowley

Acting Program Manager

cc: Kim Milburn, Public Works Director
Colleen McCarthy, Mayor

File: Helena Landfill, methane and CMA

Path: CB5403\wp\landfill\groundwater\l&c\gas

Ted Hill

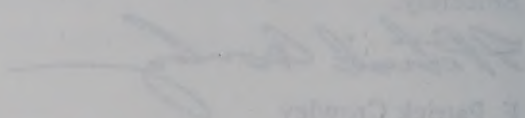
Page 3

June 17, 1997

3) Complete the closure of the landfill and submit the appropriate construction quality assurance documentation to the Department. If the city wishes to change the end use at a later date, then the Department will provide a prompt review of the proposed changes. In the mean time, we must be assured that the cap was properly constructed and the infiltration barrier is protected from weathering effects.

If you have any further questions on this matter, please feel free to contact me. My direct phone line is 408-444-3204.

Sincerely,



F. Patrick Crowley
Acting Program Manager

cc: Kim Millham, Public Works Director
Colleen McCann, Mayor

For: Helena Landell, Assistant and CMA
File: CH2403/p/landell/gmccann/mccann

County	<u>Lewis + Clark</u>
Facility & #	<u>Helena 90</u>
Closure	Landfarm
Finan Assur	Liner
GW Corr Meas	Methane
GW Monitoring	O & M
GW Reports	Run - On
Inspections	
Other:	<u>Corrective Measures</u>
	<u>Assessment</u>
	2-5

Other:	
Inspection	
GW Reports	
GW Monitoring	
GW Cont. Mass	
Line	
Leakdown	
Closure	
Entry & II	
County	

Hydrometrics, Inc.

2727 Airport Road • Helena, Montana 59601 • (406) 443-4150 • FAX (406) 443-4155

*File: Helena, MT.
CMA*

*Design is in
Methane file*

June 3, 1997

RECEIVED

JUN 04 1997

Mr. Pat Crowley
MDEQ - Permitting and Compliance Division
Community Services Bureau
P.O. Box 200901
Helena, MT 59620

MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

RE: Transmittal of Design - City of Helena Landfill Gas Extraction System - Phase 1

Dear Pat,

At the request of Ted Hill (City of Helena Environmental Engineer), this letter serves to transmit to you a set of plans for the landfill gas extraction system near the YMCA facility. This design is based on data gathered during the landfill gas well test performed earlier this year (see attachment) as well as routine methane monitoring data gathered in the past several years.

Hydrometrics, Inc. and Gas Control Engineering, Inc. have proposed a phased approach to installation of the gas collection system. Phase 1 will include the gas collection system and a temporary carbon filter for gas treatment. This system will be monitored to gather data necessary to verify the proper selection of a permanent gas treatment system in Phase 2. This phased approach is detailed as follows:

Phase 1: All systems designed to remove methane from around the YMCA facility will be installed under Phase 1 and are detailed on the attached set of plans. These systems include installation of gas wells, header pipes, condensate sumps, condensate drains, air supply lines, condensate pumps, and the extraction blower. Gas treatment will be provided by a temporary carbon filter. This plan has been discussed with Mr. David Klemp of the DEQ (with regard to air quality permitting) and he indicated that this approach was acceptable.

Gas quality and quantity after system start-up will be monitored for a period of three months. This information will allow Hydrometrics and Gas Control Engineering to verify if burning the extracted gas in the YMCA boiler is practical, and give us the data necessary for burner design (and to evaluate a retro-fit of the existing boiler system vs. a new boiler).

1. The first part of the report
describes the general situation
of the country and the
state of the economy.

1975-1976
1977-1978

Mr. Pat Crowley

June 3, 1997

Page 2.

Phase 2: Data from Phase 1 will be used to select between permanent gas treatment in the YMCA boiler, a new boiler or in a specialized flare. Should the YMCA boiler be selected, Phase 2 will proceed to specify the boiler retrofit and required piping. If supplying the boiler is impractical, a flare will be designed for installation adjacent to the Phase 1 mechanical building. Regardless of the gas treatment selected, Phase 2 will include design of control panels, automation, failure warnings, and alarms.

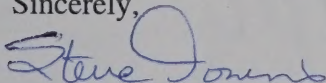
This two-phased approach allows for immediate installation of methane collection equipment as well as allows a more comprehensive and efficient design of complete controls and automation which are tailored to the gas treatment option selected.

Phase 1 will address the area apparently contributing the major portion of landfill gas at the site, and the YMCA safety issues. Also included in Phase 1, is the installation of several extraction/monitoring wells that will be monitored monthly along with the methane probe network. Data from this monitoring will be used to determine if adding these wells to the extraction system will be necessary in the future to enhance gas quality, ensure containment of methane migration or for additional water quality benefits.

Final details and construction specifications will be produced after MDEQ comments are considered and plans are finalized (if necessary). These specifications will generally be consistent with the Solid Waste Association of North America's (SWANA) Master Construction Specifications for Landfill Gas Conveyance Systems and will be available to MDEQ when the bid package is produced.

Please call if you have any questions or need further information.

Sincerely,



Steven K. Downs, P.E.
Senior Engineer

c: Mr. Kim Milburn, City of Helena Public Works Director
Mr. Ted Hill, City of Helena Environmental Engineer
Mr. Kirk Hein, Gas Control Engineering



RECEIVED

MAY 08 1995

Montana Department of Health
and Environmental Sciences
Waste Management Division

City of Helena

May 4, 1995

Ms. Pat Potts, DHES
Waste Management Division
P.O. Box 200901
Helena, MT 59620-0901

Dear Pat:

This letter is in response to your letter dated April 4, 1995, regarding the Helena Landfill Corrective Measures Assessment which was submitted to your department in February 1995. It is our hope that these responses will clarify many of the issues you raised in your letter. For your convenience, we have restated your comments and followed them with our responses. Also included are several replacement pages for your copies of the document.

General Comment #1

Possible avenues of risk and/or exposure that have not been considered in this alternative selection are:

Residences with impacted wells outside of the city limits that use their well water as a source of drinking water. Although no one contaminant exceeds a particular standard at this time, what might be the cumulative effect of these VOCs (even if they are not all attributable to the landfill) in their drinking water? Especially consider the portions of the population at higher risks, such as children and the elderly. Some of the residences that have been sampled that could be at risk are:

Robinson @ 328 Custer (#47),

C.A. Barbeau @ 308 Custer (#48),

W. Hill @ 112 Meadow (#42),

E. Hartze @ 220 Custer (#51),

No Name @ Custer and Green Meadow (#52),

MAILED
MAY 1 1955
U.S. DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION
WASHINGTON, D.C.



City of Miami

MAY 1 1955

Mr. J. Edgar Hoover
Federal Bureau of Investigation
U.S. Department of Justice
Washington, D.C.

Dear Sir:

The following information was furnished to your office on April 1, 1955, regarding the Miami Herald's circulation figures. It was submitted to your office in a letter dated April 1, 1955. It is our hope that these figures will assist you in your investigation. The year 1954 was a record year for the Miami Herald, with circulation figures reaching a high of 1,000,000. This was a significant increase over the previous year, and it was due to a number of factors, including the newspaper's expansion into new markets and its improved quality of news coverage.

Sincerely,
J. Edgar Hoover

Enclosed for your information are two copies of the Miami Herald's circulation figures for the year 1954. These figures show a significant increase in circulation, and they are a testament to the newspaper's success in the market.

The Miami Herald's circulation figures for the year 1954 were as follows: January, 1,000,000; February, 1,050,000; March, 1,100,000; April, 1,150,000; May, 1,200,000; June, 1,250,000; July, 1,300,000; August, 1,350,000; September, 1,400,000; October, 1,450,000; November, 1,500,000; December, 1,550,000. The total circulation for the year was 15,000,000. This was a record for the newspaper, and it was due to a number of factors, including the newspaper's expansion into new markets and its improved quality of news coverage.

Very truly yours,
J. Edgar Hoover

Enclosure: Miami Herald circulation figures for 1954.

Very truly yours,
J. Edgar Hoover

Enclosure: Miami Herald circulation figures for 1954.

Very truly yours,
J. Edgar Hoover

Bacon @ 108 Dunbar (#57),

Stolp @ 100 and 102 Dunbar (#59),

J. Bridges @ 76 Dunbar (#62), and

Elk River Concrete's well along Benton Avenue should have a warning sign.

Additional reinforcement discouraging the usage of irrigation wells and industrial supply wells for domestic usage/drinking within the city limits should also be considered.

Response to General Comment #1

A comprehensive risk assessment regarding cumulative affects of VOC's in groundwater is beyond the scope of the Corrective Measures Assessment (CMA). Risk based standards for each parameter of concern were determined as per ARM 16.14.708. The application of cumulative affects risk analysis is not consistent with the regulatory standards outlined in ARM.

The "Existing Corrective Measures" alternative was determined appropriate for the site based upon ARM 16.14.708 (e) which states that a "no action" alternative is appropriate if:

"the constituents are present only in waters which are currently or reasonably expected to be a source of drinking water, and are not hydraulically connected to waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the groundwater protection standards"

If future groundwater monitoring indicates that constituents are migrating beyond their present conditions, then it would be appropriate to evaluate additional corrective measures.

Existing institutional controls prohibit the usage of waters in the area where VOC's exceed or are likely to exceed the groundwater protection standards. Although these waters are hydraulically connected to drinking water source areas, it is contended that because the landfill is closed and no additional sources will be added at the landfill, that worst case conditions already exist, and it is not reasonable to assume that water with constituents exceeding the groundwater protection standards will migrate into these areas.

A notification letter from the city to well owners within the VOC plume area (as per ARM 16.14.708 (4)(a)(iii)) provided the well owners with information on the groundwater quality in the area. This letter additionally discouraged well owners from drinking the water from their wells.

Section 101 of the Act

Section 102 of the Act

Section 103 of the Act

Section 104 of the Act

Section 105 of the Act

Section 106 of the Act

Section 107 of the Act

Section 108 of the Act

Section 109 of the Act

Section 110 of the Act

Section 111 of the Act

Section 112 of the Act

General Comment #2

In general, the screening process as a whole, addressed the issues required according to ARM 16.14.708. However, it is important to point-out that the initial screening criteria are to be reviewed according to ARM 16.14.708(6)(c) which is intended to address the following points for each potential remedy:

- (i) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
- (ii) The time required to begin and complete the remedy;
- (iii) The costs of remedy implementation; and
- (iv) The institutional requirements such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(ies).

Alternatives selected through the initial screening process are to be screened according to ARM 16.14.708(7)(c) which provides the following information for each alternative selected:

- (i) The long and short-term effectiveness and protectiveness of the potential remedy(ies), along with the degree of certainty that the remedy will prove successful . . . ;
- (ii) The effectiveness of the remedy in controlling the source to reduce further releases . . . ;
- (iii) The ease or difficulty of implementing a potential remedy(ies) . . . ;
- (iv) Practicable capability of the owner or operator, including a consideration of the technical and economic capability.
- (v) The degree to which the community concerns are addressed by a potential remedy(ies).

The final selection of an appropriate remedial alternative is to be evaluated according to the following factors ARM 16.14.708(7)(b):

- (i) Be protective of human health and the environment;
- (ii) Attain the ground water protection standards as specified pursuant to (5) of this rule (i.e., ARM 16.14.708);

In addition, the following factors are to be taken into account in assessing the extent of the damage, including the extent of the damage to the environment, the extent of the damage to the health of the population, the extent of the damage to the economy, and the extent of the damage to the culture.

(1) The assessment, including, where appropriate, the assessment of the damage to the environment, the damage to the health of the population, the damage to the economy, and the damage to the culture.

(2) The time required to begin and complete the recovery.

(3) The nature of the damage, including:

(i) The physical damage, including the damage to the environment, the damage to the health of the population, the damage to the economy, and the damage to the culture.

(ii) The damage to the environment, including the damage to the environment, the damage to the health of the population, the damage to the economy, and the damage to the culture.

(iii) The damage to the health of the population, including the damage to the health of the population, the damage to the economy, and the damage to the culture.

(iv) The damage to the economy, including the damage to the economy, the damage to the health of the population, the damage to the environment, and the damage to the culture.

(v) The damage to the culture, including the damage to the culture, the damage to the health of the population, the damage to the environment, and the damage to the economy.

(vi) The damage to the environment, including the damage to the environment, the damage to the health of the population, the damage to the economy, and the damage to the culture.

(vii) The damage to the health of the population, including the damage to the health of the population, the damage to the economy, and the damage to the culture.

(viii) The damage to the economy, including the damage to the economy, the damage to the health of the population, the damage to the environment, and the damage to the culture.

(ix) The damage to the culture, including the damage to the culture, the damage to the health of the population, the damage to the environment, and the damage to the economy.

(x) The damage to the environment, including the damage to the environment, the damage to the health of the population, the damage to the economy, and the damage to the culture.

(iii) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent practicable, further releases of Table 2 [ARM 16.14.706] constituents into the environment that may pose a threat to human health or the environment;

(iv) Comply with standards for management of wastes as specified in (8) of this rule.

(v) Be approved by the Department.

Although the specified regulatory format was not strictly followed, the pertinent technical information was presented in a clear, concise manner in this document. The final remedy(ies) selected, at a minimum, should be reviewed for the criteria required according to ARM 16.14.708(7)(b).

Response to General Comment 2

ARM 16.14.708 contains several criteria for evaluation of potential corrective measures. However, no specific regulatory format for applying these criteria is presented. As discussed in Section 4.1, the criteria presented in CMA are consistent with those specified in the ARM, however they have been grouped and categorized into a CERCLA type feasibility study format. This format was selected in lieu of strict regulatory guidance because of its proven technical and regulatory defensibility.

The criteria listed in ARM 16.14.708 (7)(b) were considered in the selection process in the reliability criteria presented in Section 6. Additionally, the criteria in ARM 16.14.708(c) and the modifying criteria in ARM 16.14.708 (d) were evaluated in the additional criteria groups presented in Section 6 (Ease of Implementation, Potential Impacts, Time-frame, and Cost).

Specific Comments

1. Table 2-1

Why aren't 83-7 and EPA-2 being sampled? Are they plugged and abandoned? Was April 1994 the first time EPA-1 was sampled and the ground water analyzed for VOCs?

Are there any monitoring wells or piezometers left west-northwest of EPA-1? If so, could they be sampled?

Response:

Monitoring wells 83-7 and EPA-2 are monitored only for static water level. Monitoring wells which are routinely sampled for water quality analysis are EPA-1, MPC-HL-1, HL-90-1, HL-90-2, HL-90-3, 83-6, 94-1, 94-2, and 94-3 as per the 1993 Helena Landfill Sampling and Analysis Plan which was approved by the MDHES. EPA-1 has been routinely sampled for VOC's since 1991.

- Sample

Monitoring wells 83-7 and EPA-4 are operational wells and could be sampled assuming water table conditions are appropriate (the wells contain water - well 83-7 was dry in January 1995).

2. Page 2-3

- A. What concentration level(s) were used to calculate the volumetric equivalent of tetrachloroethene dissolved in a 365 acre, 50-foot deep plume?

Response:

The concentrations depicted by the contours on Figure 2-2 were utilized for the volume calculations, as referenced on Page 2-3. The contour method for determining average concentration and volume from contour map is a typical engineering practice.

- B. Please list the specific monitoring wells that are completed in the lower part of the aquifer, and the total depth with the length of screened interval for each well. Approximately how thick is the aquifer beneath the landfill?

Response:

Several wells have been drilled through the uppermost aquifer into a confining layer. Some of these wells have been abandoned, and are no longer in service.

The wells completed in the lower part of the aquifer include :

Monitoring Well	Total Depth	Screened Interval	Confining Layer	Confining Layer
	Depth			
HL-2	28'	to 28'	clay	25'
HL-3	35'	to 29'	bedrock	28'
HL-4	42'	to 41'	clay	36'
82-1	40'	14-34'	bedrock?	34'
82-2	43'	23-43'	cemented sed's	30'
✓ HL-90-3	no water in the alluvium - limestone at 53'			
✓ 83-6	25'	19-23'	dolomite	21'

Most of these wells are peripheral to the landfill, and several wells drilled within the landfill have not been extended to a confining layer at depth of up to about 80'. An estimated 50 foot aquifer thickness is based on these peripheral wells and existing literature (USGS 1992 - "Hydrogeology of the Helena Valley-Fill Aquifer System, West Central Montana). While this estimate is quite subjective this figure was thought to be quite conservative as the average aquifer thickness in these peripheral wells is less than 10', and previous estimates of aquifer thickness in the area have been around 20 feet (Hydrometrics, 1991 and F and M consultants, 1992).

Monitoring wells 22-1 and 22-2 are located in the same area as the other wells and would be sampled at the same time as the other wells. The wells contain water - and 22-1 was dry in January 1992.

Page 1-2

A. Water concentrations (mg/L) were used to calculate the volumetric percentage of trichloroethylene dissolved in a 25% area, 20-foot deep

Diagram:
The concentration detected by the system in Figure 1-2 were utilized for the volume calculation, as referenced on Page 1-3. The constant method for determining average concentration and volume from constant was a typical engineering practice.

It was noted that the specific monitoring wells that are completed in the lower part of the aquifer, and the total depth with the length of screened interval for each well. Apparently how thick is the aquifer beneath the landfill?

Diagram:
Several wells have been drilled through the aquifer system into a confining layer. Some of these wells have been abandoned, and are no longer in service.

The wells completed in the lower part of the aquifer include:

Monitoring Well	Depth	Screened Interval	Confining Layer	Comments
22-1	25'	20-25'	clay	
22-2	25'	20-25'	bedrock	
22-3	25'	20-25'	clay	
22-4	25'	20-25'	bedrock	
22-5	25'	20-25'	bedrock	
22-6	25'	20-25'	bedrock	
22-7	25'	20-25'	bedrock	
22-8	25'	20-25'	bedrock	
22-9	25'	20-25'	bedrock	
22-10	25'	20-25'	bedrock	
22-11	25'	20-25'	bedrock	
22-12	25'	20-25'	bedrock	
22-13	25'	20-25'	bedrock	
22-14	25'	20-25'	bedrock	
22-15	25'	20-25'	bedrock	
22-16	25'	20-25'	bedrock	
22-17	25'	20-25'	bedrock	
22-18	25'	20-25'	bedrock	
22-19	25'	20-25'	bedrock	
22-20	25'	20-25'	bedrock	
22-21	25'	20-25'	bedrock	
22-22	25'	20-25'	bedrock	
22-23	25'	20-25'	bedrock	
22-24	25'	20-25'	bedrock	
22-25	25'	20-25'	bedrock	
22-26	25'	20-25'	bedrock	
22-27	25'	20-25'	bedrock	
22-28	25'	20-25'	bedrock	
22-29	25'	20-25'	bedrock	
22-30	25'	20-25'	bedrock	
22-31	25'	20-25'	bedrock	
22-32	25'	20-25'	bedrock	
22-33	25'	20-25'	bedrock	
22-34	25'	20-25'	bedrock	
22-35	25'	20-25'	bedrock	
22-36	25'	20-25'	bedrock	
22-37	25'	20-25'	bedrock	
22-38	25'	20-25'	bedrock	
22-39	25'	20-25'	bedrock	
22-40	25'	20-25'	bedrock	
22-41	25'	20-25'	bedrock	
22-42	25'	20-25'	bedrock	
22-43	25'	20-25'	bedrock	
22-44	25'	20-25'	bedrock	
22-45	25'	20-25'	bedrock	
22-46	25'	20-25'	bedrock	
22-47	25'	20-25'	bedrock	
22-48	25'	20-25'	bedrock	
22-49	25'	20-25'	bedrock	
22-50	25'	20-25'	bedrock	
22-51	25'	20-25'	bedrock	
22-52	25'	20-25'	bedrock	
22-53	25'	20-25'	bedrock	
22-54	25'	20-25'	bedrock	
22-55	25'	20-25'	bedrock	
22-56	25'	20-25'	bedrock	
22-57	25'	20-25'	bedrock	
22-58	25'	20-25'	bedrock	
22-59	25'	20-25'	bedrock	
22-60	25'	20-25'	bedrock	
22-61	25'	20-25'	bedrock	
22-62	25'	20-25'	bedrock	
22-63	25'	20-25'	bedrock	
22-64	25'	20-25'	bedrock	
22-65	25'	20-25'	bedrock	
22-66	25'	20-25'	bedrock	
22-67	25'	20-25'	bedrock	
22-68	25'	20-25'	bedrock	
22-69	25'	20-25'	bedrock	
22-70	25'	20-25'	bedrock	
22-71	25'	20-25'	bedrock	
22-72	25'	20-25'	bedrock	
22-73	25'	20-25'	bedrock	
22-74	25'	20-25'	bedrock	
22-75	25'	20-25'	bedrock	
22-76	25'	20-25'	bedrock	
22-77	25'	20-25'	bedrock	
22-78	25'	20-25'	bedrock	
22-79	25'	20-25'	bedrock	
22-80	25'	20-25'	bedrock	
22-81	25'	20-25'	bedrock	
22-82	25'	20-25'	bedrock	
22-83	25'	20-25'	bedrock	
22-84	25'	20-25'	bedrock	
22-85	25'	20-25'	bedrock	
22-86	25'	20-25'	bedrock	
22-87	25'	20-25'	bedrock	
22-88	25'	20-25'	bedrock	
22-89	25'	20-25'	bedrock	
22-90	25'	20-25'	bedrock	
22-91	25'	20-25'	bedrock	
22-92	25'	20-25'	bedrock	
22-93	25'	20-25'	bedrock	
22-94	25'	20-25'	bedrock	
22-95	25'	20-25'	bedrock	
22-96	25'	20-25'	bedrock	
22-97	25'	20-25'	bedrock	
22-98	25'	20-25'	bedrock	
22-99	25'	20-25'	bedrock	
22-100	25'	20-25'	bedrock	

Some of these wells are peripheral to the landfill, and several wells drilled within the landfill have not been extended to a confining layer at depth of up to about 25'. An estimated 20 foot aquifer thickness is based on these peripheral wells and existing literature (1992) - Hydrogeology of the Hudson Valley-Roseton System, West Central Tennessee. While this estimate is quite subjective this figure was thought to be quite conservative as the average aquifer thickness in these peripheral wells is less than 10', and previous estimates of aquifer thickness in the area have been around 20 feet (Hydrogeology, 1992 and 1993 documents, 1992).

3. 2.2 GROUND WATER PROTECTION STANDARDS (GWPSs) pg. 2-7

- A. Methylene chloride (dichloromethane) does have a human health standard (HHS according to Montana WQB-7) which is 4.7 ug/L, and a maximum contaminant level (MCL), State and Federal, which is 5 ug/L.

Response:

Comment Noted. Page 2-7 and Table 2-2 (enclosed) have been revised to reflect this comment.

- B. What was the calculated GWPS for methylene chloride according to the risk-based equation presented on the bottom of page 2-7? How does it compare with the HHS, and the MCL?

Response:

The calculated GWPS for methylene chloride is presented on Table 2-2 (5ug/L). This is equivalent to the MCL and is an appropriate GWPS.

4. Page 2-9

Please note that the following constituents do have State HHSs, as well as State and Federal MCLs:

bromoform	HHS= 0.56 ug/L	MCL= 100 ug/L
dibromochloromethane (chlorodibromomethane)	HHS= 0.4 ug/L	MCL= 100 ug/L

Response:

We are in agreement that these constituents have established MCL's which would be appropriate for use as GWPS. However, GWPS were not listed for these constituents because these constituents are at higher concentrations upgradient and cross gradient from the landfill and are therefore not considered contaminants attributable to the landfill. *like when*

5. Page 2-9

If you can demonstrate that ground water contamination is coming from an upgradient source(s) other than the landfill through historical record documentation and/or field investigations, the Department would appreciate the timely submittal of this information, so that it can be reviewed, and so that other potentially responsible polluters or localized sources of contamination can be found and cleaned up.

Response:

Comment noted.

and these effects (disturbance) have been a human health standard. This standard is based on WHO-71 which is 4.7 mg/L and a maximum contaminant level (MCL) of 5.0 mg/L, which is a daily.

Concentrations. Pages 2-3 and Table 2-3 (continued) have been revised to reflect this comment.

It was the calculated DWI for methylchloride according to the revised equation presented on the cover of page 2-3. However, it compares with the MCL and the MCL.

The calculated DWI for methylchloride is presented in Table 2-3 (continued). This is equivalent to the MCL and is an appropriate DWI.

Pages 2-3 and the following comments do not show this, as well as some and related values.

Chloroform	MCL = 100 ug/L
Chloroethane	MCL = 100 ug/L
Chloroethylene	MCL = 100 ug/L

We are in agreement that these concentrations have established MCL's which would be appropriate for use as DWI's. However, DWI's were not listed for these chemicals because these concentrations are at higher concentrations (ppm) and more gradient from the MCL's and are therefore not considered attributable to the health.

It was determined that ground water contamination is coming from an agricultural source. This was the health through chemical waste disposal and/or field investigations. The Department would require the study and control of this contamination, so that it can be reviewed and to it other responsible parties be held liable for contamination can be held liable and required.

Comments noted.

6. Page 2-10, TABLE 2-2

GWPSs have been established for the following compounds:

bromodichloromethane (chlorodibromomethane)	HHS= 0.41 ug/L	MCL= 100 ug/L
bromoform	HHS= 0.56 ug/L	MCL= 100 ug/L
dibromochloromethane (chlorodibromomethane)	HHS= 0.4 ug/L	MCL= 100 ug/L
methylene chloride (dichloromethane)	HHS= 4.7 ug/L	MCL= 5 ug/L

These standards need to be included in Table 2-2. Also, see comments in item #4 above (i.e., section 2.2 of the document), as some of this information has been repeated for the purpose of clarity in these comments.

Response:

A GWPS is included in Table 2-2 for methylene chloride, and is consistent with the MCL referenced. A GWPS for bromodichloromethane is also included on Table 2-2. This standard is equal to the background concentration as per ARM 14.16.708 (5)(c). GWPS were not listed for bromoform or dibromochloromethane as discussed in the response to comment 4.

7. Page 2-11

- A. Please explain how, and to what particular upgradient source(s) the following constituents are attributable: arsenic, chloroform, selenium, and bromodichloro-methane. Bis (2-ethylhexyl) phthalate (check spelling in document, please) is a common laboratory contaminant and has been detected in many of the Table 2 analyses for landfills in Montana.

Response:

These constituents are attributable to upgradient sources because they are detected at higher concentrations in upgradient wells than in downgradient wells. It is beyond the scope of the CMA and the city's financial obligation to trace these constituents to specific sources. A revised page 2-11 is enclosed and has been corrected for spelling.

- B. All but one [bis (2-ethylhexyl) phthalate] of the above constituents have an MCL, and therefore, a GWP/enforcement standard. Please explain how background concentrations are compared to GWPSs/MCLs at this site for the parameters/constituents mentioned above. It is not clear from the text what exactly is intended.

DATA have been retained for the following reasons:

1. 100-1000	100-1000	100-1000
2. 100-1000	100-1000	100-1000
3. 100-1000	100-1000	100-1000
4. 100-1000	100-1000	100-1000
5. 100-1000	100-1000	100-1000
6. 100-1000	100-1000	100-1000
7. 100-1000	100-1000	100-1000
8. 100-1000	100-1000	100-1000
9. 100-1000	100-1000	100-1000
10. 100-1000	100-1000	100-1000

These standards need to be included in Table 2-1. Also, the contents in Item 4 of Section 2.2 of the document, as well as the information for Item 5, are requested for the purpose of clarity in these comments.

Response:

A QMS is included in Table 2-1 for methylene chloride, and is consistent with the full requirements. A QMS for dimethylsiloxane is also included in Table 2-1. This standard is equal to the background concentration as per ASTM D1505 (2003). QMS was not listed for propylene or dibromochloroethane as designed in the contract in Item 4.

These standards are attributable to significant sources because they are detected at higher concentrations in significant wells than in background wells. It is beyond the scope of the CMA and the city's financial ability to trace these constituents to specific sources. A revised page 2-1 is attached and has been submitted for review to the City of Montreal.

Response:

These constituents are attributable to significant sources because they are detected at higher concentrations in significant wells than in background wells. It is beyond the scope of the CMA and the city's financial ability to trace these constituents to specific sources. A revised page 2-1 is attached and has been submitted for review.

All but one (the 15-ethylhexyl pentanoate) of the above constituents have an MCL and therefore, a background concentration standard. These standards are requested concentrations are compared to the MCL/MCLs as this will be the background concentration standard. It is not clear from the text what exactly is included.

Response:

Groundwater protection standards have been developed for each of the parameters on Table 2-2. ARM 16.14.708(5) specifies the criteria for GWPS development, and the application of ARM 16.14.708 is demonstrated in the flowchart on Figure 2-3. For parameters which exhibit background concentrations above the MCL, the background concentrations were chosen as the appropriate GWPS.

- C. To what practical quantitation limit are you referring with regard to sulfides? There is a secondary drinking water standard for sulfate, but no enforcement standard, MCL, or PQL as far as I know; please explain. Also, note that the ARM citation should be corrected in this paragraph to read ARM 16.14.706.

Response:

The correction for the reference to ARM 16.14.706 is noted (revised page 2-11). The practical quantitation limit (PQL) for sulfide (according to ARM 16.14.706) is 4 mg/L which is several orders of magnitude higher than the level of sulfide detected in MPC-1. This demonstrates that the sulfide reported in the sample is suspect and at an extremely low level. No reference to MCL's or GWPS was made.

- D. Was there a reason for not including tetrachloroethene in the list of constituents entitled "potentially attributable to the landfill"? I realize the next section (i.e., 2.3 Contaminants of Concern) specifically addresses tetrachloroethene, but this chemical compound should appear on the list immediately preceding this section, as well.

Response:

Comment noted. Tetrachloroethene has been included on revised page 2-11.

8. DEGRADATION IN WATER Page 2-13

Please keep in mind that some of the commonly encountered degradation products of tetrachloroethene, when associated with landfill environments (anaerobic conditions, possible methanogenesis) are 1,2-dichloroethene (cis- and trans-), and/or vinyl chloride.

Response:

Comment noted.

9. Page 2-15

Please explain the risks, if any, that may be associated with the ingestion of tetrachloroethene which would be associated with home grown produce from backyard gardens irrigated with elevated levels of the VOCs found in the ground water at, and adjacent to the landfill. Also consider possible risks for ground water usage in swimming pools and lawn watering. In some instances, it has been

Response:

Groundwater protection standards have been developed for each of the parameters on Table 2-2. AEM 15.14.700 specifies the criteria for GWPS development, and the application of AEM 15.14.700 is demonstrated in the document on Table 2-2. For parameters with existing background concentrations above the MCL, the background concentrations were chosen as the appropriate GWPS.

To meet potential groundwater protection goals, we are reviewing with regard to whether there is a secondary drinking water standard for radon. If not, we will consider standard MCL on radon as far as it is possible to protect against radon, noting that the AEM standard should be considered in this regard to meet AEM 15.14.700.

Response:

The criterion for the response to AEM 15.14.700 is noted (revised page 2-11). The groundwater protection goal (GWPS) for radon (according to AEM 15.14.700) is a GWPS which is several orders of magnitude higher than the level of radon detected in GW-1. This demonstrates that the radon reported in the sample is not an indication of an extremely low level. No reference to MCL or GWPS was made.

We have a reason for not including radon in the list of parameters included potentially attributable to the GWPS. I realize the groundwater protection goal (GWPS) for radon is several orders of magnitude higher than the level of radon detected in GW-1. This demonstrates that the radon reported in the sample is not an indication of an extremely low level. No reference to MCL or GWPS was made.

Response:

The GWPS for radon has been included on revised page 2-11.

2. DEGRADATION IN WATER Page 2-11

Please keep in mind that the GWPS is a secondary drinking water standard. It is not a standard for radon in groundwater. The GWPS for radon is several orders of magnitude higher than the level of radon detected in GW-1. This demonstrates that the radon reported in the sample is not an indication of an extremely low level. No reference to MCL or GWPS was made.

Response:

Comment noted.

Page 2-11

Please explain the text, "I am not sure that we are consistent with the ingestion of radon in groundwater which would be associated with radon in groundwater. The GWPS for radon is several orders of magnitude higher than the level of radon detected in GW-1. This demonstrates that the radon reported in the sample is not an indication of an extremely low level. No reference to MCL or GWPS was made."

mentioned that well water is being used for drinking for various personal reasons (taste, economics, etc.).

Response:

Because the risk associated with the listed activities is intuitively less than for the drinking water exposure pathway, and it has been demonstrated that risks for utilizing these waters for drinking is extremely low, a risk assessment for these less intensive exposure pathways was considered inappropriate.

10. Page 2-16 EPA DRINKING WATER HEALTH ADVISORIES

Shouldn't the discussion concerning long-term health advisories be for protection against carcinogenic effects, not non-carcinogenic effects? If so, were the protective levels given in the text supposed to be in mg/L, or ug/L, as the MCL is only 5 ug/L for tetrachloroethene?

Response:

Carcinogenic effects are discussed beginning on the last paragraph of Page 2-16. The protective levels for non-carcinogenic effects are in mg/L as stated in the document.

11. Page 5-7, Figure 5-2 "Landfill Gas Extraction and Treatment"

This figure is inadequate for the determination of any landfill gas extraction plan. Maybe this figure was submitted incomplete by mistake. Please complete this figure to show plans for a landfill gas extraction system if you would like this technical methodology to be considered as a remedial alternative for the clean-up of the ground water contamination, and/or as possible source control.

Response:

The legend of this figure inadvertently described the shaded area as "general direction of groundwater flow" and should have read "area of landfill gas extraction". A revised Figure 5-2 is included. This area of gas extraction was preferred because this area of the landfill appears to be the main source for tetrachloroethene. Because this alternative is not a preferred remedy at this time, specific plans were not included in the CMA.

12. Page 5-10, Figure 5-4

Relatively speaking, where will the soil vapor extraction (SVE) wells and/or horizontal piping be installed relative to the air sparging plan outlined on this figure?

The Department is concerned that this approach to ground water remediation would likely result in explosive methane/air mixtures as described in Section 5.3.3. Please explain in greater detail, the likelihood of such an explosive situation, or the preventative measures that could be taken in advance to avoid this hazardous situation.

mentioned that well water is being used for drinking for various reasons (these, however, etc.).

Response: Because the risk associated with the listed activities is inherently less than for the drinking water exposure pathway, and it has been demonstrated that risks for drinking these waters for drinking is extremely low, a risk assessment for these high exposure exposure pathways was considered inappropriate.

10. Page 2-15 EPA EXAMINING WATER HEATER ADVISORIES: The EPA is examining the health effects of the listed activities for the drinking water exposure pathway, not non-drinking water effects. The EPA is not examining the health effects of the listed activities for the drinking water exposure pathway, not non-drinking water effects. The EPA is not examining the health effects of the listed activities for the drinking water exposure pathway, not non-drinking water effects.

Response: The EPA is examining the health effects of the listed activities for the drinking water exposure pathway, not non-drinking water effects. The EPA is not examining the health effects of the listed activities for the drinking water exposure pathway, not non-drinking water effects.

11. Page 2-15 Figure 2-1: "Exposure to Lead from Drinking Water" This figure is intended for the determination of the health risk associated with the listed activities. The figure was submitted in error. Please complete the figure to show the health risk associated with the listed activities. The figure was submitted in error. Please complete the figure to show the health risk associated with the listed activities.

Response: The figure was submitted in error. Please complete the figure to show the health risk associated with the listed activities. The figure was submitted in error. Please complete the figure to show the health risk associated with the listed activities.

12. Page 2-15, Figure 2-2: "Exposure to Lead from Drinking Water" This figure is intended for the determination of the health risk associated with the listed activities. The figure was submitted in error. Please complete the figure to show the health risk associated with the listed activities.

The document is intended to provide information to the public regarding the health risks associated with the listed activities. The document is intended to provide information to the public regarding the health risks associated with the listed activities.

Response:

SVE extraction would occur directly above the sparging area to ensure that vapors are not allowed to migrate back into the landfill. This would likely prevent the likelihood of an explosive situation. It is a typical practice to extract up to five times the amount of air that is injected to ensure that migration of explosive vapors will not occur.

13. Page 5-13, Figure 5-6

Maximum tetrachloroethene concentrations (i.e., those exceeding the MCL) in the ground water appear to be localized adjacent to the northwest corner of the landfill property boundary [specifically, HL-90-1 (15 to 20 ug/L)]. Both the air sparging (and apparently the SVE, if displayed) and the ground water extraction plans only cover the northern boundary of the landfill, along the railroad tracks, westward to the Elk River Concrete facility. Do you think ground water flow control and/or soil vapor extraction (i.e., behind Elk River Concrete, or just west of the transfer station) would be helpful on the west-northwest landfill facility property boundary?

Response:

This determination would be made during the design phase of these alternatives if they are determined to be necessary.

GENERAL ECONOMIC COMMENTS

The Department strongly suggests that the City have several ground water models prepared to demonstrate the effects of these proposed remediation alternatives. This should include impacts on the contaminants and contaminant concentrations, compared to the length of time required for the ground water clean-up. Physical as well as chemical factors need to be more thoroughly evaluated to determine the applicability of the specific alternative(s).

An example of such a model demonstration for pump and treat would be based on the aquifer data available and the number of extraction wells required to sufficiently depress the water table to efficiently intercept the contaminants. Based on the nature of the contaminants, will the selected alternatives efficiently address all ground water contamination, or will phase-separated products (i.e., DNAPLs at the base of the aquifer) remain behind?

Response:

The modeling referred to in this comment would be appropriate if one of these alternatives is deemed necessary. However, this modeling is quite expensive and time-consuming and is not appropriate at this time.

Would SVE be adequate, even with air sparging to address the tetrachloroethene problem in the ground water, or will this technology only deal with the less dense VOCs? Is it possible from the data available to determine if the tetrachloroethene contamination is coming from a DNAPL pool at the base of the aquifer? Detectable concentrations of 1,1,1-trichloroethane appear to be centered around a cluster

Response:

SVR extraction would occur directly above the existing line to ensure that vapors are not allowed to migrate back into the landfill. This would likely prevent the likelihood of an explosive situation. It is a typical practice to extract up to five times the amount of air that is required to ensure that migration of explosive vapors will not occur.

12. Page 7-12, Figure 7-2

The proposed extraction system (i.e., those connecting the WCL to the ground water system) is to be located adjacent to the northwest corner of the landfill property boundary (approximately, 115-00-1 (12 to 15 ft) from the site edge) and extend approximately 100 ft. It is proposed that the ground water extraction system follow the northern boundary of the landfill, along the railroad tracks, adjacent to the 115-00-1 (12 to 15 ft) from the site edge. Do you think ground water flow towards the site from the ground water system (i.e., behind the River Channel, or just inside the site) would be helped by the west-northwest landfill property boundary?

Response:

This determination would be made during the design phase of these alternatives. It may be determined to be necessary.

LANDFILL ECONOMIC CONSIDERATIONS

The Department strongly suggests that the City have several ground water monitoring systems installed to determine the effects of these proposed remediation alternatives. This should include impacts on the contaminants and groundwater monitoring systems, conducted to the length of time required for the ground water system to be removed as well as a monitoring system used to monitor the effectiveness of the remedial alternatives.

An example of such a monitoring system for ground water would be based on the existing data available and the number of extraction wells installed to effectively extract the water table to sufficiently intercept the contaminants. Based on the current monitoring system, will the selected alternatives effectively address all ground water contamination, or will phase-separated products (i.e., liquids as the base of the aquifer) remain behind?

Response:

The modeling referred to in this comment would be appropriate if one of these alternatives is deemed necessary. However, this modeling is quite expensive and time-consuming and is not appropriate at this time.

Modeling is not required, even with air sampling to address the future remediation problem at the ground water, as this technology only deals with the less dense VOCs. It is possible that the data available in the landfill monitoring system is coming from a SWAP pool at the base of the landfill. Data from monitoring of 1,1,1-trichloroethane vapors in the landfill would be a closer

of private wells located north of Custer Avenue. Does this help to explain possible degradation processes, or age date the contaminant plumes or chemical travel times in the aquifer in any way?

Response:

The spargeability (strippability) of a constituent is based upon the compounds Henry's Constant and not upon density. Compounds with a Henry's Constant of greater than 100 [atm - ($\text{m}^3\text{water} / \text{m}^3\text{air}$)] are considered readily strippable. The Henry's Constant for tetrachloroethene is 1,100. As discussed on page 2-3 of the CMA, water quality data are not indicative of a significant DNAPL plume below the landfill. The significance of the cluster of 1,1,1-trichloroethane detects in wells along Custer Ave. has not been evaluated.

Assuming a landfill gas extraction system is required at this facility anyway due to the exceedance of lower explosive levels of landfill gases in the unsaturated zone, the design plan and schedule for implementation could be included in this CMS."

Response:

The city has not assumed that a landfill gas extraction system is required at the facility at this time, however, the City has upgraded its gas monitoring efforts.

INCOMPLETE ALTERNATIVE

It has come to the Department's attention that no re-vegetation has occurred, nor has the required erosional soil cover been installed over the low permeability/non-infiltration layer. This delay in final landfill closure requirements has created extended renewal fee payments for the City. Please be advised that if these passive, source control requirements are seriously being considered as the selected alternative for ground water remediation at this site, then these final closure requirements must be met in a timely manner, or a reasonable schedule of completion dates will need to be submitted to the Department along with any additional design requirements for prompt consideration.

Response:

As you note the required revegetation is not yet in place. The City has kept individual members of your Bureau informed of the plans and status of these efforts but perhaps a summary is appropriate here.

As the time for final cover neared, the City looked for sources for suitable clay material that could be economically obtained and transported to our site. Suitable material was made available to us from the Lewis and Clark County Landfill site and a contractor was hired to haul and place it. The site was surveyed to determine how much material was required and where. After the clay was

of various wells located north of Chester Avenue. It is this hole to explain possible degradation processes at the site the surrounding ground water conditions are in the center in any way.

The aquifer (aquifer) of a confined is based upon the composition of Henry's constant and not upon density. Confined with a Henry's constant of 100 (atm - (mole/m³)) are considered readily atypical. The Henry's constant for trichloroethylene is 1,100. As discussed on page 2-3 of the GMA, water quality data are not indicative of a significant GMA/E phase about the facility. The significance of the cluster of 1,1,1-trichloroethylene in wells along Chester Ave. has not been evaluated.

Assuming a landfill gas extraction system is installed at the facility, any gas in the environment of lower relative levels of landfill gas to the groundwater would be design and schedule for implementation could be included in this

The city has not assumed that a landfill gas extraction system is required at the facility at this time, however, the City has upgraded its gas monitoring efforts.

INCIDENTAL ALTERNATIVE

It was noted in the Department's statement that no re-vegetation has occurred. The new the proposed extraction and cover have installed over the low permeability gas collection system. The design for final landfill closure would require that it be a gas collection system, which would require that the gas collection system be installed at the site. The design for final landfill closure would require that it be a gas collection system, which would require that the gas collection system be installed at the site. The design for final landfill closure would require that it be a gas collection system, which would require that the gas collection system be installed at the site.

Department

As you note the proposed re-vegetation is not yet in place. The City has had individual members of your business interest of the phase and status of these efforts but perhaps a summary is appropriate here.

As the time for final cover nears, the City is working on the various for suitable site material that could be economically obtained and transported to the site. Suitable material was made available to us from the Lewis and Clark County landfill site and a contractor was hired to haul and place it. The site was surveyed to determine how much material was required and where. About the City was

delivered to the site the contractor distributed it. This process also compacted the clay layer very well over the large fairly level areas. The site was then resurveyed. Several areas were found with insufficient depth and others that had an excess. The City decided to haul in more clay to fill the low spots rather than try to redistribute what had already been compacted. Neither clay nor a hauling contractor were available before winter (1994-1995). The material was hauled to the site as soon as possible in the spring of 1995. The city expects to have all material properly placed, compacted as required, and seeded before winter of 1995.

Another related item that is not yet complete is the methane monitoring wells. The Bureau has directed the City to install three methane monitoring probes in the toe of the slope along the north edge of closed landfill. This slope is so steep that platforms must be constructed for the drill rig to operate from. This adds considerable time and cost. The City has proposed that these wells be located instead on city property across the tracks to the north. This would protect human health and property at least as well as the Bureau's directed action. If the Bureau would agree to this, the methane monitoring wells could be in place in a few days at much less cost to the public.

REQUIRED PUBLIC MEETING

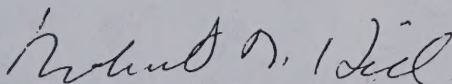
The required public meeting [ARM 16.14.708 (6) (d)] will also be necessary to finalize the actual alternative selection. It is the responsibility of the owner/operator to schedule this meeting and provide sufficient public notice. The Department suggests that we have a meeting well in advance of the public meeting to discuss the above issues, and hopefully agree on the most effective and appropriate approach to ground water remediation at this site for all involved parties.

Response:

The city agrees that it would be appropriate to discuss these issues with the department, and would like to schedule a meeting in the near future.

We look forward to discussing these issues with you in person. Please call if you have any questions.

Sincerely,



Robert T. Hill
Environmental Engineer

delivered to the site the contractor distributed it. This process also compacted the clay layer down over the large fairly level areas. The clay was then removed. Several areas were found with insufficient depth and others that were too deep. The City decided to limit its work to the level of the existing clay layer and to compact it. The City also decided to limit its work to the level of the existing clay layer and to compact it. The City also decided to limit its work to the level of the existing clay layer and to compact it.

As shown related item that is not yet complete in the western monitoring wells. The Bureau has directed the City to limit these western monitoring wells to the level of the clay layer and to compact it. The City also decided to limit its work to the level of the existing clay layer and to compact it. The City also decided to limit its work to the level of the existing clay layer and to compact it.

REQUIRED PUBLIC MEETING

The required public meeting (FARM 1A.706 (b) (3)) will also be necessary to discuss the public meeting and provide sufficient public notice. The Department suggests that we have a meeting with the public to discuss the public meeting and provide sufficient public notice. The Department suggests that we have a meeting with the public to discuss the public meeting and provide sufficient public notice.

The City agrees that it would be appropriate to discuss these issues with the Department, and would like to schedule a meeting in the near future.

We look forward to discussing these issues with you in person. Please call me when you are available.

Sincerely,

Robert T. Hill
Robert T. Hill
Environmental Engineer

constituent identified as potentially attributable to the City of Helena Landfill or migrating through the landfill is established as one of the following according to the flow chart presented in Figure 2-3:

- the maximum contaminant level (MCL) for that constituent;
- the background concentration for the constituent;
- established health-based standard for the constituent (Circular WQB-7); or
- concentration established by risk analysis performed in accordance with ARM 16.14.708 (5) (d).

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MAY 08⁹ 1995

Montana Department of Health
and Environmental Sciences
Waste Management Division

Construction identified as substantially attributable to the City of Houston, Texas, is
indicated through the legend as well as one of the following is listed in the list
of projects in Figure 5:

- the Houston County Jail (HCCJ) for the construction
 - the Houston County Jail (HCCJ) for the construction
 - the Houston County Jail (HCCJ) for the construction
 - the Houston County Jail (HCCJ) for the construction
 - the Houston County Jail (HCCJ) for the construction
- 14-14-02 (2) (a)

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MAY 11 1992
Houston County Jail
14-14-02 (2) (a)

TABLE 2-2
Development of Groundwater Protection Standards

Parameter	Max. Detect. Upgradient (mg/L)	Max. Detect. Inside RCB (mg/L)	Max. Detect. Downgradient (mg/L)	Potentially Attributed to Helena Landfill?	Develop GW Protection Standard?	Contaminant of Concern?	GW Protection Standard (mg/L)	GW Protection Standard Basis
Arsenic	0.0070	nd	nd	no	✓*	no	0.05	(1)
Barium	nd	0.1000	0.1000	✓	✓	no	2.0	(1)
Iron	0.0900	0.0300	nd	✓	✓	no	300	(4)
Selenium	0.0270	nd	nd	no	✓*	no	0.05	(1)
Zinc	0.0300	0.1500	0.0700	✓	✓	no	5.0	(4)
1,1,1-Trichloroethane	nd	0.0041	0.0017	✓	✓	no	0.2	(1)
1,1-Dichloroethane	nd	0.0073	0.0010	✓	✓	no	0.007	(1)
1,2-Dichloropropane	nd	0.0028	nd	✓	✓	no	0.005	(1)
Bromodichloromethane	0.0170	nd	0.0015	no	✓*	no	0.017	(2)
Bromoform	0.0150	nd	nd	no	-	-	-	-
Carbon Disulfide	nd	nd	0.0021	no	-	-	-	-
Chloroform	0.0620	0.0061	0.0430	no	✓*	no	0.062	(2)
Cis-1,2-Dichloroethene	nd	0.0018	0.0024	✓	✓	no	0.07	(1)
Dibromochloromethane	0.0290	nd	nd	no	-	-	-	-
Dichlorodifluoromethane	nd	0.0044	0.0030	✓	✓	no	6.9	(4)
Methylene Chloride	nd	0.0021	0.0012	✓	✓	no	0.005	(1)
Tetrachloroethene	0.0052	0.0410	0.0051	✓	✓	✓	0.005	(1)
Toluene	nd	nd	0.0062	✓	✓	no	1.0	(1)
Trichloroethene	nd	0.0031	nd	✓	✓	no	0.005	(1)
Trichlorofluoromethane	nd	0.0030	0.0015	✓	✓	no	10.0	(4)
Trans-1,4-Dichloro-2-Butene	nd	nd	0.0020	no	-	-	-	-
Bis (2-ethylhexyl) Phthalate	0.0100	nd	nd	no	✓*	no	0.01	(3)
Cyanide (total)	nd	0.0400	0.0047	✓	✓	no	0.2	(4)
Sulfide	nd	0.0400	nd	✓	no**	-	-	-

Concentrations in **bold** equal or exceed the Groundwater Protection Standard

- (1) Maximum Contaminant Level (MCL) as adopted by the State of Montana
- (2) Based on highest value measured in background wells
- (3) Background concentration exceeds MCL or health-based standard
- (4) Health-based standard (from Circular WQB-7)
- (5) Based on risk analysis performed in accordance with ARM 16.14.708 (5) (d)

RCB Relative Compliance Boundary

nd Not Detected

- Parameter has been eliminated - no Groundwater Protection Standard is established

✓* Groundwater Protection Standard necessary despite upgradient source

no** No existing guidance or standards for protection of human health

Shading indicates a Contaminant of Concern

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 Montana Department of Health
 and Environmental Sciences
 Waste Management Division

TABLE 3
Development of the American Petroleum Institute

Year	Assets	Liabilities	Equity	Income	Expenses	Net Income	Dividends	Reserves
1911	100	100	0	100	100	0	0	0
1912	150	150	0	150	150	0	0	0
1913	200	200	0	200	200	0	0	0
1914	250	250	0	250	250	0	0	0
1915	300	300	0	300	300	0	0	0
1916	350	350	0	350	350	0	0	0
1917	400	400	0	400	400	0	0	0
1918	450	450	0	450	450	0	0	0
1919	500	500	0	500	500	0	0	0
1920	550	550	0	550	550	0	0	0
1921	600	600	0	600	600	0	0	0
1922	650	650	0	650	650	0	0	0
1923	700	700	0	700	700	0	0	0
1924	750	750	0	750	750	0	0	0
1925	800	800	0	800	800	0	0	0
1926	850	850	0	850	850	0	0	0
1927	900	900	0	900	900	0	0	0
1928	950	950	0	950	950	0	0	0
1929	1000	1000	0	1000	1000	0	0	0
1930	1050	1050	0	1050	1050	0	0	0
1931	1100	1100	0	1100	1100	0	0	0
1932	1150	1150	0	1150	1150	0	0	0
1933	1200	1200	0	1200	1200	0	0	0
1934	1250	1250	0	1250	1250	0	0	0
1935	1300	1300	0	1300	1300	0	0	0
1936	1350	1350	0	1350	1350	0	0	0
1937	1400	1400	0	1400	1400	0	0	0
1938	1450	1450	0	1450	1450	0	0	0
1939	1500	1500	0	1500	1500	0	0	0
1940	1550	1550	0	1550	1550	0	0	0
1941	1600	1600	0	1600	1600	0	0	0
1942	1650	1650	0	1650	1650	0	0	0
1943	1700	1700	0	1700	1700	0	0	0
1944	1750	1750	0	1750	1750	0	0	0
1945	1800	1800	0	1800	1800	0	0	0
1946	1850	1850	0	1850	1850	0	0	0
1947	1900	1900	0	1900	1900	0	0	0
1948	1950	1950	0	1950	1950	0	0	0
1949	2000	2000	0	2000	2000	0	0	0
1950	2050	2050	0	2050	2050	0	0	0
1951	2100	2100	0	2100	2100	0	0	0
1952	2150	2150	0	2150	2150	0	0	0
1953	2200	2200	0	2200	2200	0	0	0
1954	2250	2250	0	2250	2250	0	0	0
1955	2300	2300	0	2300	2300	0	0	0
1956	2350	2350	0	2350	2350	0	0	0
1957	2400	2400	0	2400	2400	0	0	0
1958	2450	2450	0	2450	2450	0	0	0
1959	2500	2500	0	2500	2500	0	0	0
1960	2550	2550	0	2550	2550	0	0	0
1961	2600	2600	0	2600	2600	0	0	0
1962	2650	2650	0	2650	2650	0	0	0
1963	2700	2700	0	2700	2700	0	0	0
1964	2750	2750	0	2750	2750	0	0	0
1965	2800	2800	0	2800	2800	0	0	0
1966	2850	2850	0	2850	2850	0	0	0
1967	2900	2900	0	2900	2900	0	0	0
1968	2950	2950	0	2950	2950	0	0	0
1969	3000	3000	0	3000	3000	0	0	0
1970	3050	3050	0	3050	3050	0	0	0
1971	3100	3100	0	3100	3100	0	0	0
1972	3150	3150	0	3150	3150	0	0	0
1973	3200	3200	0	3200	3200	0	0	0
1974	3250	3250	0	3250	3250	0	0	0
1975	3300	3300	0	3300	3300	0	0	0
1976	3350	3350	0	3350	3350	0	0	0
1977	3400	3400	0	3400	3400	0	0	0
1978	3450	3450	0	3450	3450	0	0	0
1979	3500	3500	0	3500	3500	0	0	0
1980	3550	3550	0	3550	3550	0	0	0
1981	3600	3600	0	3600	3600	0	0	0
1982	3650	3650	0	3650	3650	0	0	0
1983	3700	3700	0	3700	3700	0	0	0
1984	3750	3750	0	3750	3750	0	0	0
1985	3800	3800	0	3800	3800	0	0	0
1986	3850	3850	0	3850	3850	0	0	0
1987	3900	3900	0	3900	3900	0	0	0
1988	3950	3950	0	3950	3950	0	0	0
1989	4000	4000	0	4000	4000	0	0	0
1990	4050	4050	0	4050	4050	0	0	0
1991	4100	4100	0	4100	4100	0	0	0
1992	4150	4150	0	4150	4150	0	0	0
1993	4200	4200	0	4200	4200	0	0	0
1994	4250	4250	0	4250	4250	0	0	0
1995	4300	4300	0	4300	4300	0	0	0
1996	4350	4350	0	4350	4350	0	0	0
1997	4400	4400	0	4400	4400	0	0	0
1998	4450	4450	0	4450	4450	0	0	0
1999	4500	4500	0	4500	4500	0	0	0
2000	4550	4550	0	4550	4550	0	0	0
2001	4600	4600	0	4600	4600	0	0	0
2002	4650	4650	0	4650	4650	0	0	0
2003	4700	4700	0	4700	4700	0	0	0
2004	4750	4750	0	4750	4750	0	0	0
2005	4800	4800	0	4800	4800	0	0	0
2006	4850	4850	0	4850	4850	0	0	0
2007	4900	4900	0	4900	4900	0	0	0
2008	4950	4950	0	4950	4950	0	0	0
2009	5000	5000	0	5000	5000	0	0	0
2010	5050	5050	0	5050	5050	0	0	0
2011	5100	5100	0	5100	5100	0	0	0
2012	5150	5150	0	5150	5150	0	0	0
2013	5200	5200	0	5200	5200	0	0	0
2014	5250	5250	0	5250	5250	0	0	0
2015	5300	5300	0	5300	5300	0	0	0
2016	5350	5350	0	5350	5350	0	0	0
2017	5400	5400	0	5400	5400	0	0	0
2018	5450	5450	0	5450	5450	0	0	0
2019	5500	5500	0	5500	5500	0	0	0
2020	5550	5550	0	5550	5550	0	0	0
2021	5600	5600	0	5600	5600	0	0	0
2022	5650	5650	0	5650	5650	0	0	0
2023	5700	5700	0	5700	5700	0	0	0
2024	5750	5750	0	5750	5750	0	0	0
2025	5800	5800	0	5800	5800	0	0	0

Source: American Petroleum Institute, "Development of the American Petroleum Institute," 1965.

1. The American Petroleum Institute (API) is a non-profit organization that represents the interests of the petroleum industry in the United States. It was founded in 1919 and has since then been a leading voice for the industry. The API's primary purpose is to promote the development and use of petroleum products, and to protect the interests of its members. It does this through a variety of activities, including lobbying, public relations, and research. The API is also involved in many other activities, such as the development of industry standards and the promotion of energy conservation. The API is a member of the International Chamber of Commerce (ICC) and the International Union of Pure and Applied Chemistry (IUPAC). It is also a member of the American Association of Economic Geologists (AAEG) and the American Association of Petroleum Geologists (AAPG). The API is a 501(c)(6) organization, which means that it is exempt from federal income tax. It is also exempt from state income tax. The API's assets are held in a trust for the benefit of its members. The API's income is derived from a variety of sources, including membership fees, donations, and the sale of its publications. The API's expenses are used for a variety of purposes, including lobbying, public relations, and research. The API's financial statements are audited annually by an independent accounting firm. The API's financial statements are made available to its members and to the public. The API's financial statements show that the organization has a strong financial base and is well-positioned to carry out its mission. The API's financial statements also show that the organization is committed to transparency and accountability. The API's financial statements are a testament to the organization's success and its commitment to the petroleum industry.

DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C. 20315
ATTENTION: ADJUTANT GENERAL
DATE: 10/1/2023

protection standards have been established for the following constituents to verify that detected concentrations remain attributable to up-gradient sources:

- Arsenic
- Bromodichloromethane
- Chloroform
- Bis (2-ethylhexyl) Phthalate
- Selenium

Sulfide was detected at MPC-1, but at concentrations considerably lower than the practical quantitation limit listed in ARM 16.14.706. No guidance or standards have been established for protection of human health for sulfide, and therefore, no groundwater protection standards has been established:

The remaining constituents were detected during sampling and are potentially attributable to the landfill. Therefore, groundwater protection standards were established for the following (Table 2-2):

- Barium
- Cyanide
- Dichlorodifluoromethane
- 1,1-Dichloroethane
- Cis-1,2-Dichloroethene
- 1,2-Dichloropropane
- Iron
- Methylene Chloride
- Toluene
- 1,1,1-Trichloroethane
- Trichloroethene
- Trichlorofluoromethane
- Zinc
- Tetrachloroethene

2.3 CONTAMINANTS OF CONCERN

Previous sections have detailed the detection of several organic and inorganic constituents in monitoring wells in and near the Helena Landfill. In order for a chemical constituent to be considered a Contaminant of Concern for corrective measures consideration, it must meet the following criteria:

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protection standards have been established for the following compounds to verify that
 chemical compounds are present in the air at levels which are not harmful to health.

- * Benzene
- * Carbon monoxide
- * Lead
- * Nitrogen dioxide
- * Sulfur dioxide
- * Toluene

Health was affected in 1974, but a comprehensive health study was done in 1975. The results of this study have
 revealed that there is no health hazard from the levels of these compounds in the air. The results of this study have
 been used to establish the protection of human health for sulfur, lead, and nitrogen dioxide.
 Protection standards have been established.

The following compounds were listed as being harmful to the protection of human health
 in the health study. The following protection standards were established for the
 following compounds:

- * Benzene
- * Carbon monoxide
- * Lead
- * Nitrogen dioxide
- * Sulfur dioxide
- * Toluene
- * Benzene
- * Carbon monoxide
- * Lead
- * Nitrogen dioxide
- * Sulfur dioxide
- * Toluene

1.1. CONTAMINANTS OF CONCERN

Previous studies have shown the location of several organic and inorganic
 compounds in the atmosphere and in the water. In order to establish
 standards for the protection of human health, it is necessary to know the location
 of these compounds in the atmosphere and in the water. The following table
 shows the location of these compounds in the atmosphere and in the water.

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 PUBLIC HEALTH SERVICE
 DIVISION OF AIR AND TOXICS
 1015 ALBANY STREET, N.W.
 WASHINGTON, D.C. 20541



Legend



Area of Landfill Gas Extraction

Scale

In Feet



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Proj. No: CHHL03
Dwg. No: 52895014
Drawn By: 0083
Last Update: 5/3/95
Ref. Dwg: 52895009
Rev. Date:

Montana Department of Health
and Environmental Sciences
Waste Management Division

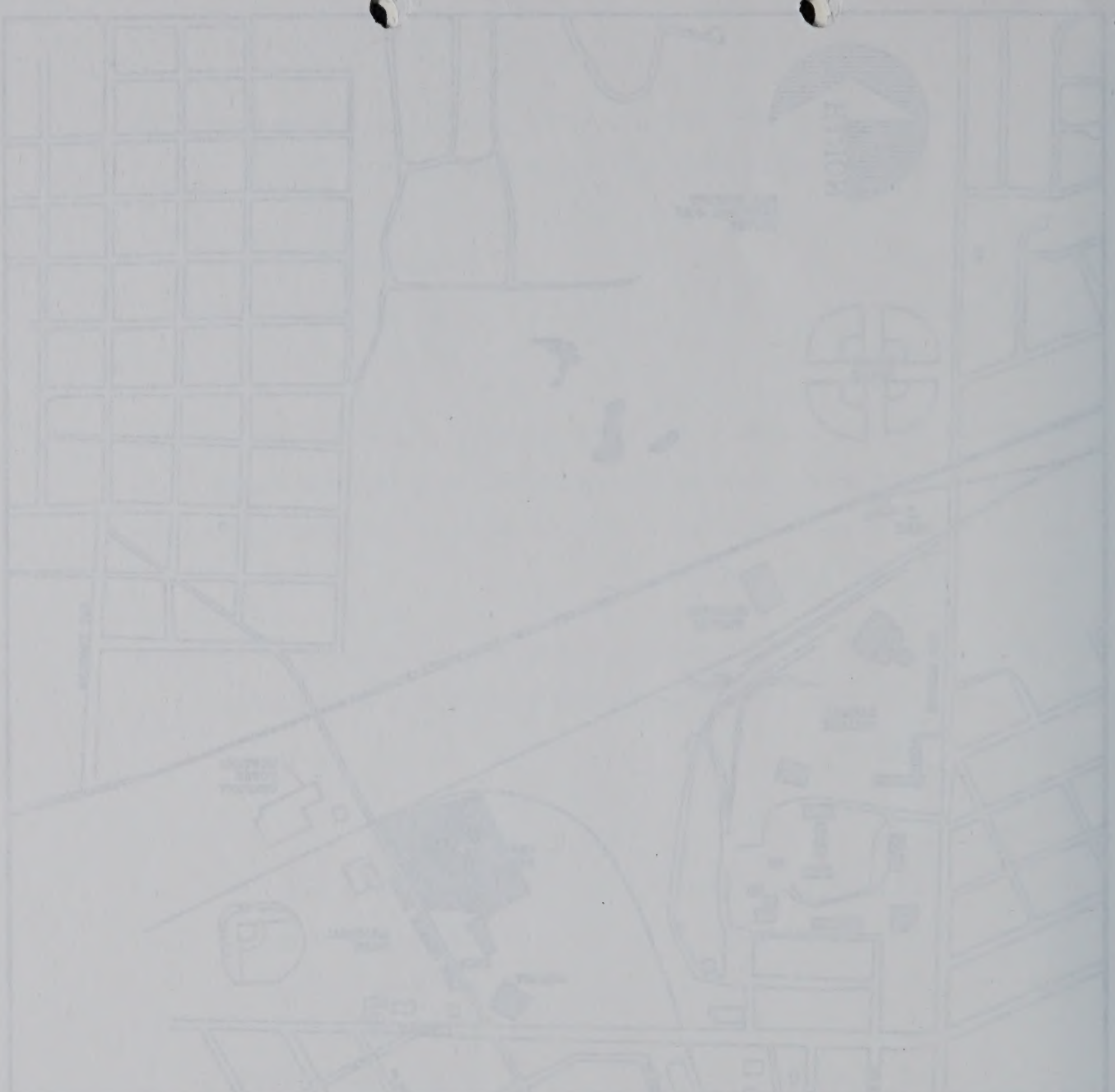
Hydrometrics, Inc.

Figure 5-2

Alternative 2:

Landfill Gas Extraction and Treatment

City of Helena Landfill
Helena, Montana



Scale



Legend

Area of land on restriction

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MAY 14 1957

City of Kansas City
 Division of Public Works
 Landfill Gas Extraction and Treatment
 Alternative 2
 Figure 2-2

HydroMetric, Inc.
 1000 West 12th Street
 Kansas City, Missouri 64105
 Tel. 432-1234
 Fax 432-5678
 Date: 5/14/57
 Drawn by: J. Smith
 Checked by: J. Smith
 Project: Landfill Gas Extraction and Treatment
 Sheet: 2 of 2

HydroMetric, Inc. 1000 West 12th Street Kansas City, Missouri 64105 Tel. 432-1234 Fax 432-5678 Date: 5/14/57 Drawn by: J. Smith Checked by: J. Smith Project: Landfill Gas Extraction and Treatment Sheet: 2 of 2

constituent identified as potentially attributable to the City of Helena Landfill or migrating through the landfill is established as one of the following according to the flow chart presented in Figure 2-3:

- the maximum contaminant level (MCL) for that constituent;
- the background concentration for the constituent;
- established health-based standard for the constituent (Circular WQB-7); or
- concentration established by risk analysis performed in accordance with ARM 16.14.708 (5) (d).

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equipment installed at various locations to the City of Houston, Texas, or
equipment through the building is considered as one of the following categories in the flow
chart presented in Figure 1-1.

- The maximum water level (MWL) for that equipment.
 - The background concentration for the equipment.
 - Estimated health based standard for the equipment (EHSB-TP) or
 - Concentration established by risk analysis performed in accordance with ARMA
- 16 14 708 (2) (b)

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TABLE 2-2
Development of Groundwater Protection Standards

Parameter	Max. Detect. Upgradient (mg/L)	Max. Detect. Inside RCB (mg/L)	Max. Detect. Downgradient (mg/L)	Potentially Attributed to Helena Landfill?	Develop GW Protection Standard?	Contaminant of Concern?	GW Protection Standard (mg/L)	GW Protection Standard Basis
Arsenic	0.0070	nd	nd	no	✓*	no	0.05	(1)
Barium	nd	0.1000	0.1000	✓	✓	no	2.0	(1)
Iron	0.0900	0.0300	nd	✓	✓	no	300	(4)
Selenium	0.0270	nd	nd	no	✓*	no	0.05	(1)
Zinc	0.0300	0.1500	0.0700	✓	✓	no	5.0	(4)
1,1,1-Trichloroethane	nd	0.0041	0.0017	✓	✓	no	0.2	(1)
1,1-Dichloroethane	nd	0.0073	0.0010	✓	✓	no	0.007	(1)
1,2-Dichloropropane	nd	0.0028	nd	✓	✓	no	0.005	(1)
Bromodichloromethane	0.0170	nd	0.0015	no	✓*	no	0.017	(2)
Bromoform	0.0150	nd	nd	no	-	-	-	-
Carbon Disulfide	nd	nd	0.0021	no	-	-	-	-
Chloroform	0.0620	0.0061	0.0430	no	✓*	no	0.062	(2)
Cis-1,2-Dichloroethene	nd	0.0018	0.0024	✓	✓	no	0.07	(1)
Dibromochloromethane	0.0290	nd	nd	no	-	-	-	-
Dichlorodifluoromethane	nd	0.0044	0.0030	✓	✓	no	6.9	(4)
Methylene Chloride	nd	0.0021	0.0012	✓	✓	no	0.005	(1)
Tetrachloroethene	0.0052	0.0410	0.0051	✓	✓	✓	0.005	(1)
Toluene	nd	nd	0.0062	✓	✓	no	1.0	(1)
Trichloroethene	nd	0.0031	nd	✓	✓	no	0.005	(1)
Trichlorofluoromethane	nd	0.0030	0.0015	✓	✓	no	10.0	(4)
Trans-1,4-Dichloro-2-Butene	nd	nd	0.0020	no	-	-	-	-
Bis (2-ethylhexyl) Phthalate	0.0100	nd	nd	no	✓*	no	0.01	(3)
Cyanide (total)	nd	0.0400	0.0047	✓	✓	no	0.2	(4)
Sulfide	nd	0.0400	nd	✓	no**	-	-	-

Concentrations in **bold** equal or exceed the Groundwater Protection Standard

- (1) Maximum Contaminant Level (MCL) as adopted by the State of Montana
- (2) Based on highest value measured in background wells
- (3) Background concentration exceeds MCL or health-based standard
- (4) Health-based standard (from Circular WQB-7)
- (5) Based on risk analysis performed in accordance with ARM 16.14.708 (5) (d)

RCB Relative Compliance Boundary

nd Not Detected

- Parameter has been eliminated - no Groundwater Protection Standard is established

✓* Groundwater Protection Standard necessary despite upgradient source

no** No existing guidance or standards for protection of human health

Shading indicates a Contaminant of Concern

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TABLE 1
Description of the instrument - 12-point Likert scale

Item	1	2	3	4	5	6	7	8	9	10	11	12
1. I am very satisfied with my life	1	2	3	4	5	6	7	8	9	10	11	12
2. I am very satisfied with my work	1	2	3	4	5	6	7	8	9	10	11	12
3. I am very satisfied with my family	1	2	3	4	5	6	7	8	9	10	11	12
4. I am very satisfied with my friends	1	2	3	4	5	6	7	8	9	10	11	12
5. I am very satisfied with my health	1	2	3	4	5	6	7	8	9	10	11	12
6. I am very satisfied with my money	1	2	3	4	5	6	7	8	9	10	11	12
7. I am very satisfied with my education	1	2	3	4	5	6	7	8	9	10	11	12
8. I am very satisfied with my religion	1	2	3	4	5	6	7	8	9	10	11	12
9. I am very satisfied with my culture	1	2	3	4	5	6	7	8	9	10	11	12
10. I am very satisfied with my environment	1	2	3	4	5	6	7	8	9	10	11	12
11. I am very satisfied with my future	1	2	3	4	5	6	7	8	9	10	11	12
12. I am very satisfied with my life in general	1	2	3	4	5	6	7	8	9	10	11	12

Measurement is a point scale in which the respondents indicate their level of satisfaction.

1. I am very satisfied with my life
2. I am very satisfied with my work
3. I am very satisfied with my family
4. I am very satisfied with my friends
5. I am very satisfied with my health
6. I am very satisfied with my money
7. I am very satisfied with my education
8. I am very satisfied with my religion
9. I am very satisfied with my culture
10. I am very satisfied with my environment
11. I am very satisfied with my future
12. I am very satisfied with my life in general

13. I am very satisfied with my life

14. I am very satisfied with my work

15. I am very satisfied with my family

16. I am very satisfied with my friends

17. I am very satisfied with my health

18. I am very satisfied with my money

END X.0 YAH

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protection standards have been established for the following constituents to verify that detected concentrations remain attributable to up-gradient sources:

- Arsenic
- Bromodichloromethane
- Chloroform
- Bis (2-ethylhexyl) Phthalate
- Selenium

Sulfide was detected at MPC-1, but at concentrations considerably lower than the practical quantitation limit listed in ARM 16.14.706. No guidance or standards have been established for protection of human health for sulfide, and therefore, no groundwater protection standards has been established:

The remaining constituents were detected during sampling and are potentially attributable to the landfill. Therefore, groundwater protection standards were established for the following (Table 2-2):

- Barium
- Cyanide
- Dichlorodifluoromethane
- 1,1-Dichloroethane
- Cis-1,2-Dichloroethene
- 1,2-Dichloropropane
- Iron
- Methylene Chloride
- Toluene
- 1,1,1-Trichloroethane
- Trichloroethene
- Trichlorofluoromethane
- Zinc
- Tetrachloroethene

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2.3 CONTAMINANTS OF CONCERN

Previous sections have detailed the detection of several organic and inorganic constituents in monitoring wells in and near the Helena Landfill. In order for a chemical constituent to be considered a Contaminant of Concern for corrective measures consideration, it must meet the following criteria:

protection standards have been established for the following chemicals to which the chemical manufacturers remain subjected to regulation:

- Lead
- Chlorine
- Hydrochloric acid
- Hydrofluoric acid

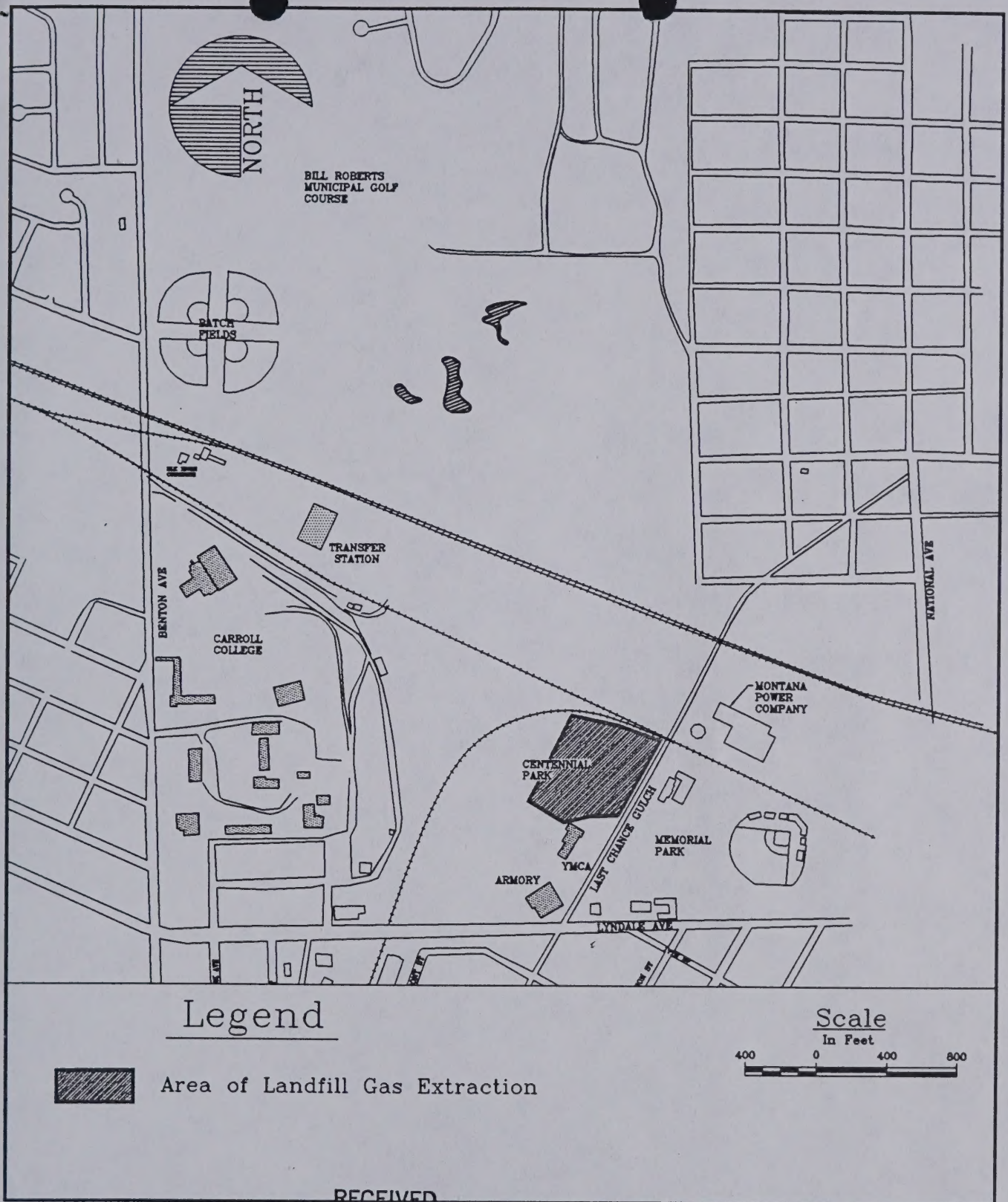
It is noted that at 50°C., the concentration is considerably lower than the previous standard that had in 1970. The purpose of standard has been established for protection of human health in the event of exposure to hazardous chemicals has been established.

The necessary standards were derived during sampling and the necessary standards for the health. The necessary protection standards were established for the following (Table 1-1):

- | | |
|----------------------|-------------------------|
| • Lead | • Lead |
| • Dichloromethane | • 1,1-Dichloroethane |
| • 1,2-Dichloroethane | • 1,3-Dichloropropane |
| • Benzene | • Methylene chloride |
| • Toluene | • 1,1,1-Trichloroethane |
| • Trichloroethene | • Trichloroethylene |
| • Tetrachloroethene | • Tetrachloroethene |

2.1. CONTAMINANTS OF COPIES

Previous studies have detailed the history of various organic and inorganic contaminants in manufacturing water in the United States. In order for a chemical to be considered a Contaminant of Concern for sensitive resources, consideration must meet the following criteria:



Proj. No: CHHL03
 Dwg. No: 52895014
 Drawn By: 0083
 Last Update: 5/3/95
 Ref. Dwg: 52895009
 Rev. Date:

Hydrometrics, Inc.

MAY 09 1995

Montana Department of Health
 and Environmental Sciences
 Waste Management Division

Figure 5-2

Alternative 2:

Landfill Gas Extraction and Treatment

City of Helena Landfill
 Helena, Montana



Hydrometrix, Inc.
 City of Houston
 Figure 2-5
 Title Block
 Legend
 Scale
 Area of Interest



City of Helena

February 3, 1995

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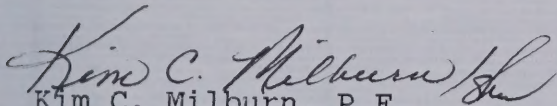
Pat Potts
Dept. of Health & Environmental Sciences
Solid Waste Program
2209 Phoenix Avenue
P.O. Box 200901
Helena MT 59620-0901

Dear Pat:

Enclosed are two final copies of the Corrective Measures Assessment, City of Helena Landfill- Helena, Montana. This assessment is being submitted for review by your department as required by Montana Solid Waste Management Regulations.

Please call me at 447-8426 if you have any questions.

Sincerely,


Kim C. Milburn, P.E.
Public Works Director

KCM:skw

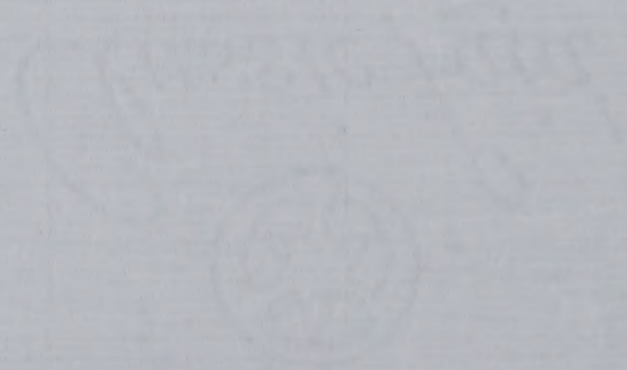
c Steve Downs
Ted Hill

landfill.cma

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Environmental Quality
Waste Management Division

ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELENA LANDFILL
HELENA MONTANA

Prepared for

Mr. Kim Milburn
Director of Public Works
CITY OF HELENA
Helena, MT 59601

Prepared by
HYDROMETRICS, INC.
2727 Airport Road
Helena, MT 59601

February 1996

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4.0 SCHEDULE FOR IMPLEMENTATION OF CORRECTIVE ACTION ---	4-1

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ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELENA LANDFILL
CITY OF HELENA

1.0 INTRODUCTION

This addendum to the Corrective Measures Assessment (CMA) for the Helena Landfill has been prepared to present to the Montana Department of Environmental Quality (MDEQ) and to the public, proposed corrective actions which will be implemented by the City of Helena, in addition to those presented in the original CMA. Based on discussions with MDEQ and subsequent evaluation, the City of Helena proposes that the installation of a landfill gas (LFG) extraction system in the Centennial Park will provide water quality benefits beyond the alternatives presented in the CMA. The installation of this system was discussed in Section 5.2 of the CMA and will be further detailed in this addendum.

Section 2.0 of this addendum provides an evaluation and overview of 1995 water quality data collected at the site, to demonstrate current conditions at the site. Section 3.0 describes the proposed additional corrective actions, and Section 4.0 outlines the proposed schedule for implementation of the corrective actions.

ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELLEN LANDFILL
CITY OF HELLEN

1.0 INTRODUCTION

This addendum to the Corrective Measures Assessment (CMA) for the Hellen Landfill has been prepared to present to the Montana Department of Environmental Quality (MDEQ) and to the public proposed corrective actions which will be implemented by the City of Hellen. In addition to those presented in the original CMA, based on discussions with MDEQ and independent evaluation, the City of Hellen proposes that the installation of a landfill gas (LFG) extraction system in the Central Park will provide water quality benefits beyond the alternatives presented in the CMA. The installation of the system was discussed in Section 3.2 of the CMA and will be further detailed in this addendum.

Section 1.0 of this addendum provides an evaluation and overview of 1995 water quality data collected at the site. In addition, current conditions at the site. Section 3.0 describes the proposed additional corrective actions, and Section 4.0 outlines the proposed schedule for implementation of the corrective actions.

2.0 EVALUATION OF 1995 WATER QUALITY DATA

This section characterizes the current extent and degree of groundwater contamination present at and downgradient from the landfill site. Included are summaries of water quality data collected during 1995, as well as a potentiometric map and an iso-concentration contour map for tetrachloroethylene for data collected in December 1995. More detailed water quality information and a tabularized presentation of all of the data will be included in the 1995 Annual Water Resources Monitoring Report.

Figure 2-1 is a potentiometric contour map showing current groundwater flow directions. This map is similar to the map presented in the CMA, but also incorporates data from four new monitoring wells (MPC-3, MPC-4, MPC-5, MPC-6) installed by Montana Power Company just east of the landfill. The data from these wells is consistent with previous interpretations of groundwater flow in this area, and shows that there is not significant flow eastward from the landfill.

Two separate sampling events were conducted during 1995. Samples were collected from 26 wells, eight of which are either up-gradient or cross-gradient from the landfill area. Groundwater samples collected were analyzed for chemical constituents potentially found in landfill leachate. Sample results indicated a detection of 27 constituents. Table 2-1 lists the maximum concentration of each constituent detected during 1995.

Chloroform was the most prevalent organic constituent detected during the 1995 groundwater monitoring (detected in 13 of the 26 wells). Review of 1995 data indicates that chloroform concentrations in groundwater are at higher concentrations upgradient and cross-gradient than in areas directly down-gradient from the landfill. Chloroform discovered throughout the study area does not appear to originate from the landfill.

This section characterizes the current extent and degree of groundwater contamination present at and downgradient from the landfill site. Included are summaries of water quality data collected during 1993, as well as a potentiometric map and an isopotentiometric map for the study area. The isopotentiometric map for data collected in December 1993 shows detailed water quality information and a tabulated presentation of all of the data will be included in the 1993 Annual Water Resource Monitoring Report.

Figure 3-1 is a potentiometric map showing current groundwater flow directions. This map is similar to the map presented in the CMAA, but also incorporates data from four new monitoring wells (MPC-3, MPC-4, MPC-5, MPC-6) installed by Midcontinent Power Company just east of the landfill. The data from these wells is consistent with previous interpretations of groundwater flow in this area, and shows that there is no significant flow eastward from the landfill.

Two separate sampling events were conducted during 1993. Samples were collected from 36 wells, eight of which are either up-gradient or cross-gradient from the landfill site. Groundwater samples collected were analyzed for chemical constituents potentially found in landfill leachate. Sample results indicate a detection of 27 constituents. Table 3-1 lists the maximum concentration of each constituent detected during 1993.

Chloroform was the most prevalent organic constituent detected during the 1993 groundwater monitoring period in 13 of the 36 wells. Review of 1993 data indicates that chloroform concentrations in groundwater are at higher concentrations up-gradient and cross-gradient than in areas directly down-gradient from the landfill. Chloroform detected throughout the study area does not appear to originate from the landfill.

Of the detected constituents only 2 (nitrate and tetrachloroethene) existed in concentration which exceed the maximum contaminant limit (MCL) specified under Montana regulation. Nitrate concentrations upgradient of the landfill were well above those down-gradient so this constituent is not attributable to the landfill. Tetrachloroethene concentrations downgradient from the landfill were consistent with values for 1994. However, in the apparent source area near monitoring well EPA-1, tetrachloroethene concentrations were significantly lower than in 1994. A corresponding drop in tetrachloroethene concentration is expected down-gradient from the landfill in the future. } why?

Tetrachloroethene (also known as perchlorethylene) was detected in 7 of the 26 wells. Figure 2-2 is an isoconcentration map showing the areal distribution of tetrachloroethene in groundwater near the Helena Landfill. Although the PCE plume presented in Figure 2-2 covers a large areal extent, concentrations representing the tetrachloroethene plume are significantly lower than in 1994.

LEGEND

MONITORING WELL

IGATION WELL

WELL

WELL

EXTRATION GALLERY

CONCENTRATION CONTOUR LINE,
MINIMUM 1994 DETECTIONS IN M/L
WELL WHERE DETECTED

AREAL DIRECTION OF GROUNDWATER FLOW

STUDY AREA AND

JANUARY 1994

EXTRAMITTED SURFACE

FIGURE

2-1

Of the detected constituents only 7 (nitrate and perchlorate) existed in concentrations which exceed the maximum contaminant limit (MCL) specified under Maximum Contaminant Level Goal (MCLG). These concentrations represent the highest concentrations detected in the landfill. The concentration is not attributable to the landfill. The concentration of these constituents from the landfill was consistent with values for 1994. However, in the adjacent source area near the landfill, EPA-1, perchlorate concentrations were significantly lower than in 1994. A corresponding drop in perchlorate concentration is expected down-gradient from the landfill in the future.

Perchlorate (also known as perchlorate) was detected in 7 of the 36 wells. Figure 1-2 is an isopleth map showing the spatial distribution of perchlorate in groundwater near the landfill. Although the PCE plume presented in Figure 2-1 covers a large area, concentrations representing the perchlorate plume are significantly lower than in 1994.



WELL	WATER TABLE ELEVATION (ft)
HL-90-1	3892.14
HL-90-2	3904.36
HL-90-3	3901.72
MPC-1	3925.08
MPC-2	3920.17
HL-94-1	3936.77
HL-94-2	3937.04
HL-94-3	3933.28
83-6	3979.55
13	3881.14
19	3852.29
28	3940.25
28	3880.51
41	3870.19
92	3903.09
I-1	3795.96
I-2	3883.60
I-5	3895.71
I-6	3914.10
MPC-3	3937.51
MPC-4	3939.93
MPC-5	3937.24
MPC-6	3937.18
EPA-1	3936.12
EPA-2	DRY
EPA-4	3909.97
HL-1	3973.16
INF.GALLERY	3912.83

LEGEND

PIEZOMETER

MONITORING WELL

IRRIGATION WELL

DOMESTIC WELL

FILTRATION GALLERY

CONCENTRATION CONTOUR LINE,
MAXIMUM 1994 DETECTIONS IN $\mu\text{g/L}$
(DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

STUDY AREA AND
JANUARY 1996
POTENTIOMETRIC SURFACE

FIGURE

2-1

Of the detected constituent only 2 (in this and trichloroethylene) existed in concentrations which exceed the maximum contaminant level (MCL) specified under Montana regulations. While concentrations upstream of the landfill were well above those downstream, trichloroethylene is not attributable to the landfill. Trichloroethylene concentrations downstream from the landfill were consistent with values for 1994. However, in the adjacent source area near monitoring well EPA-1, trichloroethylene concentrations were significantly lower than in 1994. A corresponding drop in trichloroethylene concentration is expected down-gradient from the landfill in the future.

Trichloroethylene (also known as perchloroethylene) was detected in 7 of the 26 wells. Figure 1-2 is an isopleth map showing the spatial distribution of trichloroethylene in groundwater near the Haines Landfill. Although the PCE plume presented in Figure 2, 2 covers a large area, the plume representing the trichloroethylene plume are significantly lower than in 1994.



Parameter	Montana MCL (mg/L)	Maximum or Minimum Detection (mg/L)	Outside Relative Compliance Boundary						
			31 (mg/L)	57 (mg/L)	62 (mg/L)	75 (mg/L)	93 (mg/L)	96 (mg/L)	Inf. Gal (mg/L)
Arsenic	0.05	0.007	-	-	-	-	-	-	-
Barium	2.0	0.100	-	-	-	-	-	-	-
Iron	na	1.990	-	-	-	-	-	-	-
Selenium	0.05	0.022	-	-	-	-	-	-	-
Zinc	na	0.030	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.2000	0.003	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.0070	0.007	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.0050	0.002	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	na	0.003	nd	nd	nd	nd	nd	nd	nd
Carbon Disulfide	na	0.002	nd	nd	nd	nd	nd	nd	nd
Chloroform	na	0.020	0.008	0.002	0.010	nd	0.002	nd	nd
Cis-1,2-Dichloroethene	0.0700	0.002	nd	nd	nd	nd	nd	nd	nd
Dichlorodifluoromethane	na	0.002	nd	0.001	0.001	nd	nd	nd	nd
Methylene Chloride	na	0.001	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	0.0050	0.024	nd	0.002	0.002	nd	nd	nd	nd
Toluene	1.0	0.002	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	0.0050	0.003	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	na	0.001	nd	nd	nd	nd	nd	nd	nd
Chloride	na	126.000	-	-	-	-	-	-	-
Cobalt	na	0.020	-	-	-	-	-	-	-
Nickel	na	0.040	-	-	-	-	-	-	-
Nitrate & Nitrite	10.0	42.800	-	-	-	-	-	-	-
Sulfate	na	1860.000	-	-	-	-	-	-	-
Thallium	na	1.200	-	-	-	-	-	-	-
m&p - xylenes	na	0.004	nd	nd	nd	nd	nd	nd	nd
o - xylene	na	0.003	nd	nd	nd	nd	nd	nd	nd
Cyanide	na	9.500	-	-	-	-	-	-	-

Parameters in **bold** indicate results higher than Montana MCL

na Not applicable

nd Not detected

- Not analyzed



TABLE 2-1
MAXIMUM DETECTION FOR WELLS SAMPLED DURING 1995

Parameter	Montana MCL (mg/L)	Maximum or Minimum Detection (mg/L)	Up-gradient or cross-gradient								Inside Relative Compliance Boundary					Outside Relative Compliance Boundary											
			83-6 (mg/L)	HL-94-1 (mg/L)	HL-94-2 (mg/L)	HL-94-3 (mg/L)	MPC-3 (mg/L)	MPC-4 (mg/L)	MPC-5 (mg/L)	MPC-6 (mg/L)	EPA1 (mg/L)	MPC-1 (mg/L)	MPC-2 (mg/L)	HL-90-1 (mg/L)	HL-90-2 (mg/L)	I-1 (mg/L)	HL-90-3 (mg/L)	5 (mg/L)	13 (mg/L)	31 (mg/L)	57 (mg/L)	62 (mg/L)	75 (mg/L)	93 (mg/L)	96 (mg/L)	Inf. Gal (mg/L)	
Arsenic	0.05	0.007	nd	nd	0.007	nd	nd	nd	nd	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Barium	2.0	0.100	nd	nd	nd	nd	nd	nd	nd	0.100	0.100	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Iron	na	1.990	0.050	nd	nd	nd	0.810	0.180	1.990	nd	0.060	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Selenium	0.05	0.022	nd	nd	nd	nd	0.010	0.022	0.006	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Zinc	na	0.030	nd	nd	nd	nd	nd	0.010	nd	0.010	nd	nd	-	nd	nd	-	0.030	-	-	-	-	-	-	-	-	-	
1,1,1-Trichloroethane	0.2000	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,1-Dichloroethane	0.0070	0.007	nd	nd	nd	nd	nd	nd	nd	nd	0.002	0.007	nd	0.002	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,2-Dichloropropane	0.0050	0.002	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Bromodichloromethane	na	0.003	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbon Disulfide	na	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Chloroform	na	0.020	nd	0.004	0.004	0.020	nd	nd	nd	nd	0.004	0.002	nd	0.003	nd	nd	0.004	0.002	0.006	0.008	0.002	0.010	nd	0.002	nd	nd	
Cis-1,2-Dichloroethene	0.0700	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dichlorodifluoromethane	na	0.002	nd	nd	nd	nd	nd	nd	nd	nd	0.001	0.002	nd	0.001	nd	nd	nd	nd	0.002	nd	0.001	0.001	nd	nd	nd	nd	
Methylene Chloride	na	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Tetrachloroethene	0.0050	0.024	nd	nd	nd	nd	nd	nd	nd	nd	0.024	0.014	nd	0.012	nd	nd	nd	0.002	0.003	nd	0.002	0.002	nd	nd	nd	nd	
Toluene	1.0	0.002	nd	0.002	nd	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Trichloroethene	0.0050	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.003	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Trichlorofluoromethane	na	0.001	nd	nd	nd	nd	nd	nd	nd	nd	0.001	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Chloride	na	126.000	23.000	22.000	65.000	22.000	18.000	56.000	13.000	8.000	26.000	51.000	-	30.000	31.000	-	23.000	-	-	-	-	-	-	-	-	-	
Cobalt	na	0.020	nd	nd	nd	nd	nd	nd	0.020	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Nickel	na	0.040	nd	nd	nd	nd	0.010	0.020	0.020	0.010	0.040	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Nitrate & Nitrite	10.0	42.800	7.590	6.810	6.120	11.700	37.700	42.800	21.400	4.920	6.830	11.700	-	6.870	1.300	-	6.330	-	-	-	-	-	-	-	-	-	
Sulfate	na	1860.000	92.000	131.000	94.000	179.000	1180.000	336.000	1860.000	38.000	144.000	187.000	-	126.000	66.000	-	116.000	-	-	-	-	-	-	-	-	-	
Thallium	na	1.200	nd	nd	nd	nd	1.200	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
m&p - xylenes	na	0.004	nd	nd	nd	nd	nd	nd	0.004	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
o - xylene	na	0.003	nd	nd	nd	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Cyanide	na	9.500	nd	nd	nd	0.040	3.420	0.666	9.500	0.036	nd	0.038	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	

Parameters in **bold** idicate results higher than Montana MCL

na Not applicable

nd Not detected

- Not analyzed



WELL	PCE ($\mu\text{g/L}$) MCL= 5
HL-90-1	12
HL-90-2	ND
HL-90-3	ND
MPC-1	14
MPC-2	ND
HL-94-1	ND
HL-94-2	ND
HL-94-3	ND
83-6	ND
5	1.8
13	3.1
31	ND
57	1.8
62	1.8
75	ND
93	ND
98	ND
I-1	ND
MPC-3	ND
MPC-4	ND
MPC-5	ND
MPC-6	ND
EPA-1	24
INF.GALLERY	ND

ND = NOT DETECTED

LEGEND

1 KILOMETER

MONITORING WELL

INVESTIGATION WELL

PROTECTIVE WELL

EXFILTRATION GALLERY

ISOCONCENTRATION CONTOUR LINE,
MINIMUM 1995 DETECTIONS IN $\mu\text{g/L}$
(SHED WHERE INFERRED)

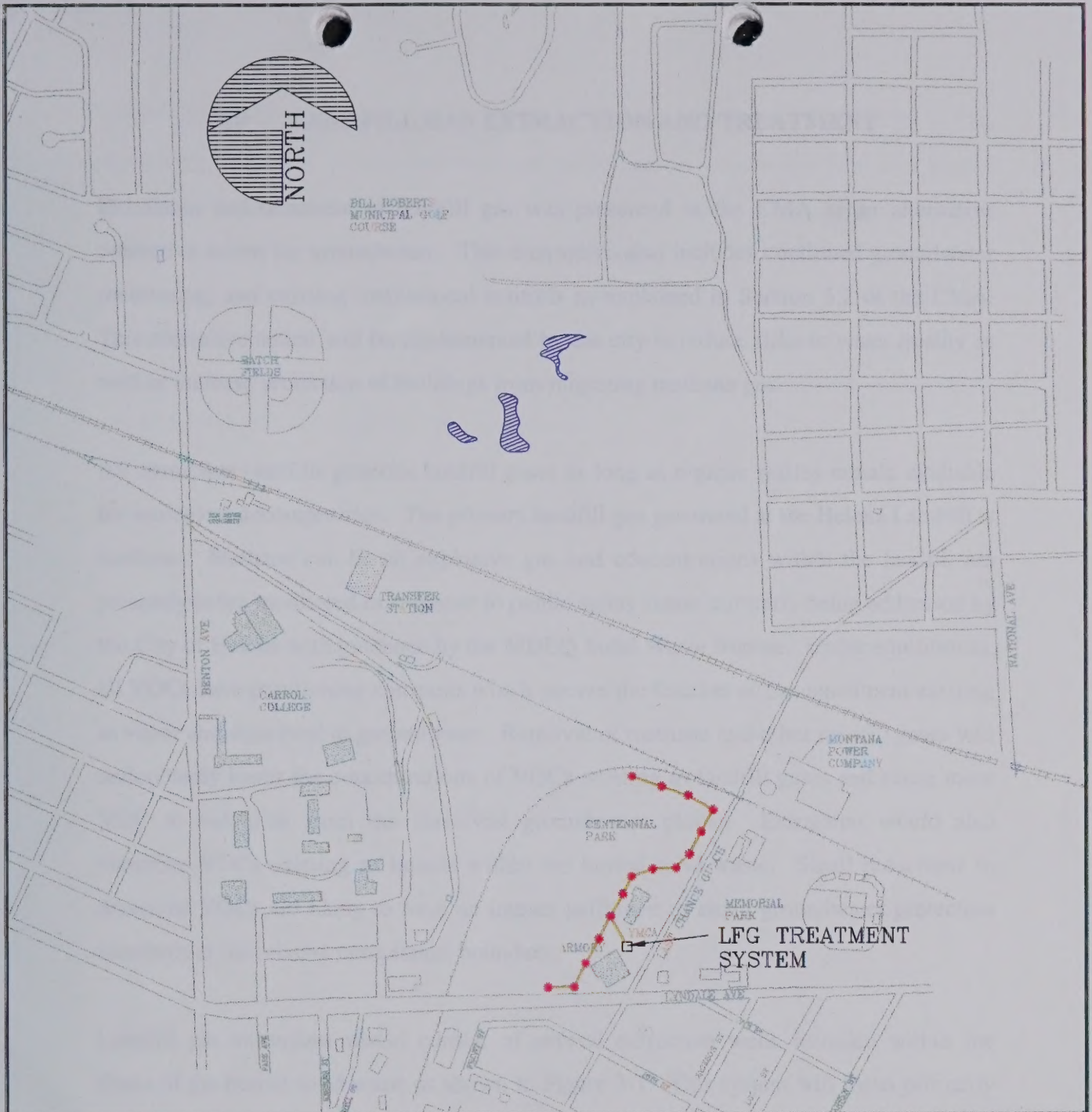
GENERAL DIRECTION OF GROUNDWATER FLOW

REAL DISTRIBUTION OF
TRACHLOROETHENE (PCE)
IN GROUNDWATER DECEMBER 1995

FIGURE

2-2





CITY OF HELENA LANDFILL
ADDENDUM TO CORRECTIVE MEASURES
ASSESSMENT
HELENA, MONTANA

LANDFILL GAS EXTRACTION AND TREATMENT

FIGURE

3-1

LEGEND

Scale

LEGEND

LEGEND

Sheet

1-5

LEGEND

LEGEND

3.0 LANDFILL GAS EXTRACTION AND TREATMENT

Extraction and treatment of landfill gas was presented in the CMA as an alternative corrective action for groundwater. This alternative also includes continued groundwater monitoring, and existing institutional controls as explained in Section 5.2 of the CMA. This corrective action will be implemented by the city to reduce risks to water quality as well as increase protection of buildings from migrating methane gas.

All municipal landfills generate landfill gases as long as organic wastes remain available for biological decomposition. The primary landfill gas generated at the Helena Landfill is methane. Methane can be an explosive gas and concentrations within the landfill are presently being monitored in response to public safety issues currently being addressed by the City of Helena with guidance by the MDEQ Solid Waste Bureau. Under equilibrium, all VOCs have partitioning constants which govern the fraction of the constituent existing as vapor and dissolved in groundwater. Removal of methane and other landfill gases will undoubtedly lower the concentrations of VOCs existing as landfill gases and cause more VOC to volatilize from the dissolved groundwater plume. Extraction would also volatilize VOCs existing as liquids within the buried solid waste. Small reductions in dissolved VOCs are likely to have an impact sufficient to attain groundwater protection standards at the relative compliance boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the buried solid waste as shown in Figure 3-1. This system will focus primarily on areas of public safety concern and would also be extended to include the apparent source area for tetrachloroethene contamination. An explosion-proof blower would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow to the well and be removed from the landfill area.

Extraction and treatment of landfill gas was presented in the CMA as an alternative corrective action for groundwater. This alternative also includes continued groundwater monitoring and existing institutional controls as explained in Section 2.2 of the CMA. The corrective action will be implemented by the City to reduce risks to water quality as well as increase protection of buildings from migrating methane gas.

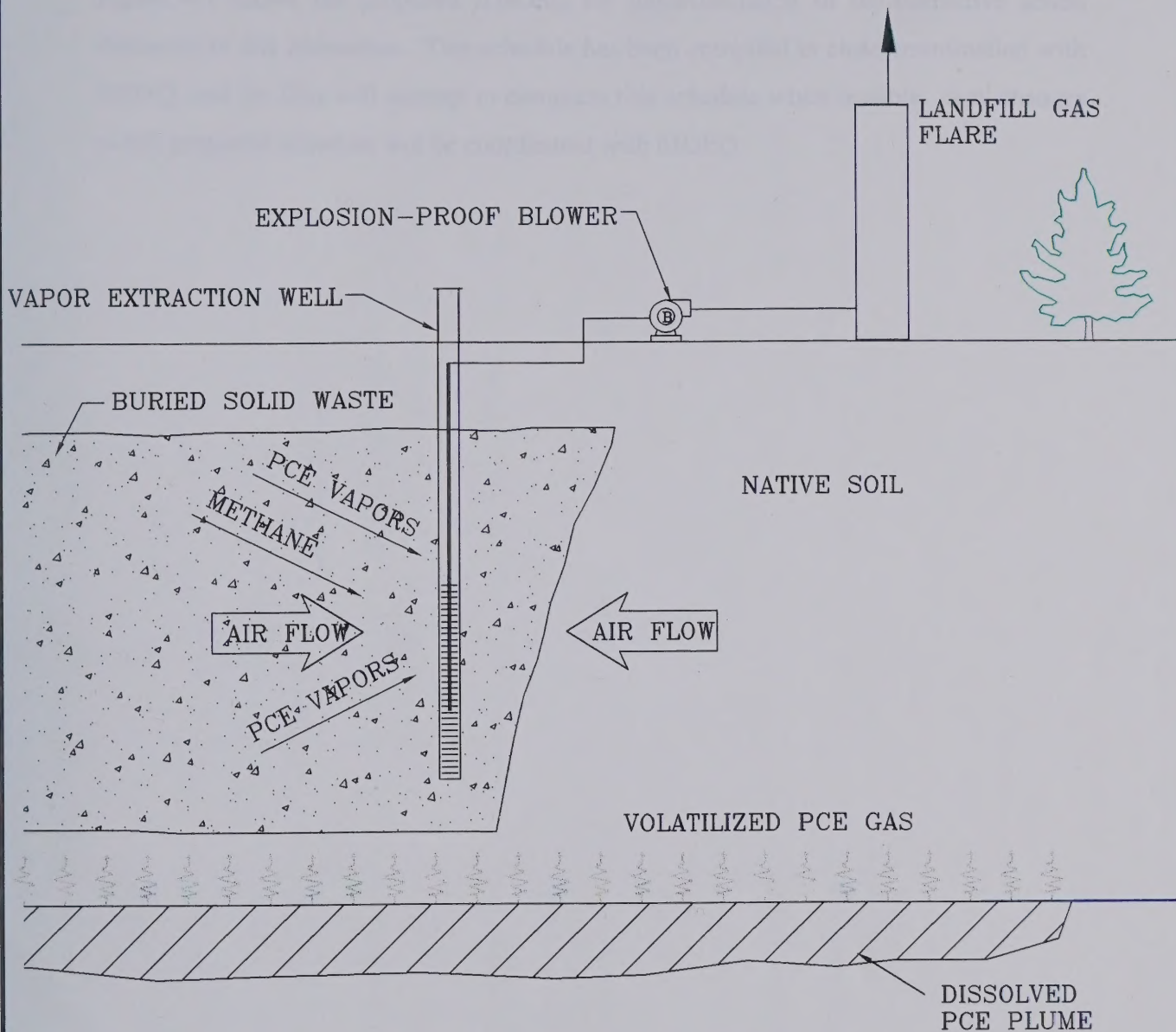
All non-hazardous landfill gas components landfill gases as long as organic wastes remain available for biological degradation. The primary landfill gas generated at the Helena Landfill is methane. Methane can be an explosive gas and concentrations within the landfill are presently being monitored in response to public safety issues currently being addressed by the City of Helena with guidance by the MDEQ Solid Waste Bureau. Under equilibrium, all VOCs have partitioning constants which govern the fraction of the constituent existing as vapor and dissolved in groundwater. Removal of methane and other landfill gases will substantially lower the concentrations of VOCs existing as landfill gases and cause more VOC to volatilize from the dissolved groundwater phase. Extraction would also volatilize VOCs existing as liquids within the buried solid waste. Small reductions in dissolved VOCs are likely to have an impact sufficient to attain groundwater protection standards at the future remedial boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the future solid waste as shown in Figure 3-1. This system will focus primarily on areas of public safety concern and would also be extended to include the apparent source area for trichloroethylene contamination. An explosion-proof blower would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow to the well and be removed from the landfill area.

Extracted landfill gases are most commonly treated by thermal destruction. This alternative will likely include destruction of landfill gases, including VOCs, in a landfill gas flare or equivalent (Figure 3-2). This treatment method is effective at removing VOCs and is commonly used at solid waste landfills. Further characterization of the amount and composition of the landfill gas present at the Helena Landfill is being performed as part of the extraction system design. The actual location (spacing) of extraction wells, number of wells, and location of the treatment system will also be presented when final design has been completed.



Exhausted landfill gases are most commonly treated by thermal destruction. This alternative will likely include destruction of landfill gases including VOCs as a landfill gas flare or expander (Figure 1-2). This treatment method is effective at removing VOCs and is commonly used as solid waste landfill. Further characterization of the amount and composition of the landfill gas present at the Helons Landfill is being performed as part of the extraction system design. The actual location (spacing) of extraction wells, number of wells, and location of the treatment system will also be determined when final design has been completed.



CITY OF HELENA LANDFILL
ADDENDUM TO CORRECTIVE MEASURES
ASSESSMENT
HELENA, MONTANA

LANDFILL GAS EXTRACTION SCHEMATIC

FIGURE

3-2



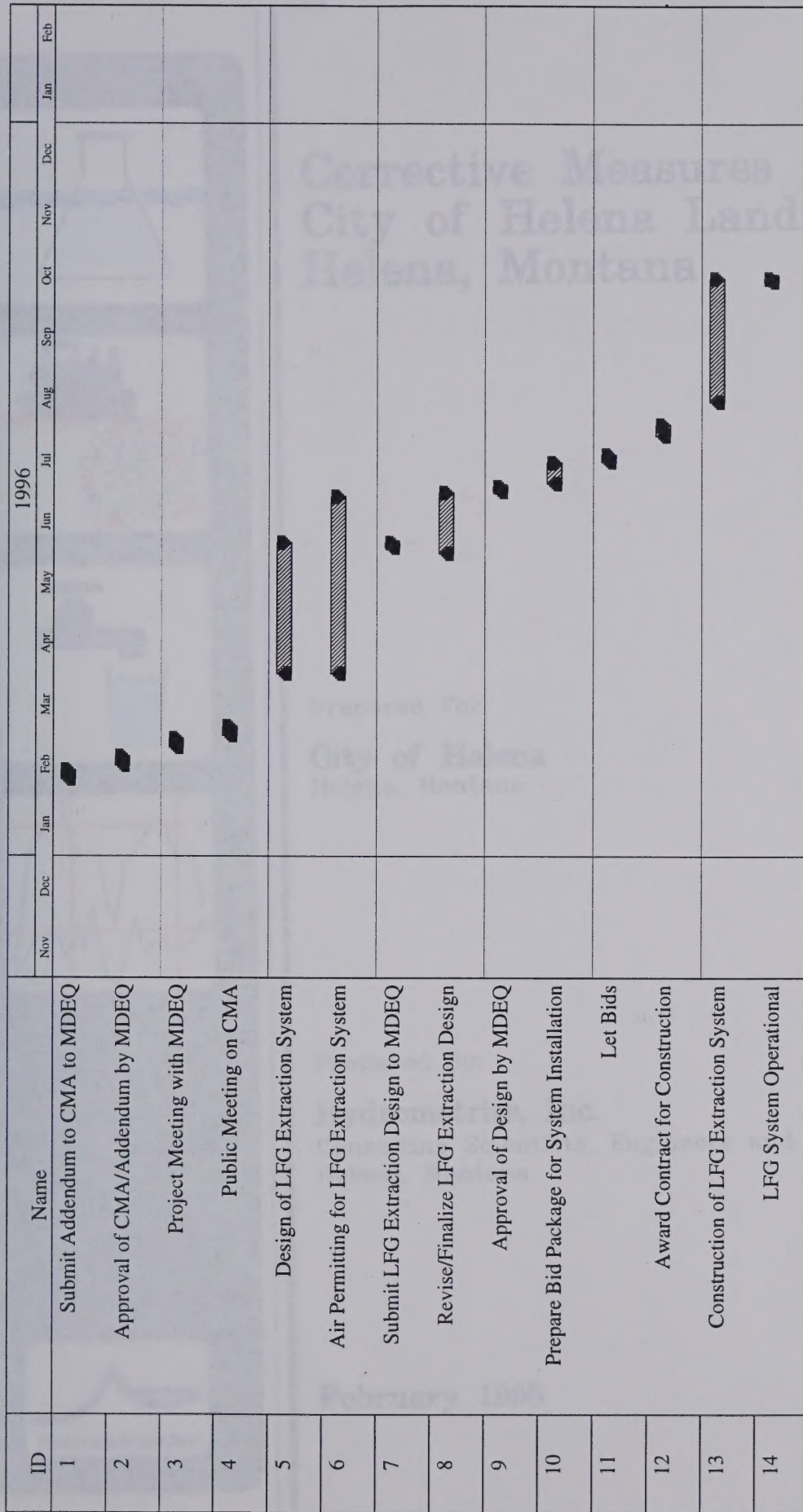
4.0 SCHEDULE FOR IMPLEMENTATION OF CORRECTIVE ACTION

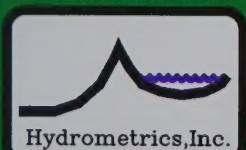
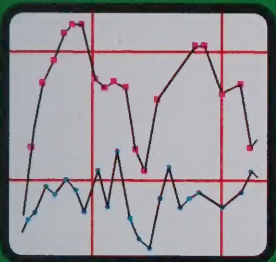
Figure 4-1 shows the proposed schedule for implementation of the corrective action discussed in this addendum. This schedule has been compiled in close coordination with MDEQ, and the City will attempt to compress this schedule when feasible. Any changes to this proposed schedule will be coordinated with MDEQ.

4. SCHEDULE FOR IMPLEMENTATION OF CORRECTIVE ACTION

Figure 4-1 shows the proposed schedule for implementation of the corrective action discussed in this addendum. This schedule has been developed in close coordination with MDEQ, and the City will attempt to complete this schedule when feasible. Any changes to this proposed schedule will be coordinated with MDEQ.

FIGURE 4-1: PROPOSED IMPLEMENTATION SCHEDULE





Corrective Measures Assessment City of Helena Landfill Helena, Montana

Prepared For:

City of Helena
Helena, Montana

Prepared By:

Hydrometrics, Inc.

Consulting Scientists, Engineers and Contractors
Helena, Montana

February 1995

Corrective Measures Assessment
City of Helena Landfill
Helena, Montana

Prepared for
City of Helena
Helena, Montana

Prepared by
Hydrometrix, Inc.
Consulting Scientists, Engineers and Contractors
Helena, Montana

February 1995



CORRECTIVE MEASURES ASSESSMENT

FOR THE HELENA LANDFILL

HELENA MONTANA

Prepared for

Mr. Kim Milburn
Director of Public Works
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Helena, MT 59601

Prepared by

HYDROMETRICS, INC.

2727 Airport Road
Helena, MT 59601

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FEB 03 1995

Montana Department of Health
and Environmental Sciences
Waste Management Division

February 1995

CORRECTIVE MEASURES ASSESSMENT

FOR THE BELLEVUE LANDFILL

HELENA, MONTANA

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RECEIVED

FEB 03 1992

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February 1992

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CORRECTIVE MEASURES ASSESSMENT

FOR THE HELENA LANDFILL

CITY OF HELENA

1.0 INTRODUCTION

Hydrometrics, Inc. has prepared this Corrective Measures Assessment (CMA) for the Helena Landfill at the request of the City of Helena. This assessment fulfills the requirements set forth in the Administrative Rules of Montana (ARM) 16.14.708 for assessing potential corrective measures for groundwater contamination at landfills in Montana.

The City of Helena has been monitoring the quality of groundwater at and near the landfill as required by the Administrative Rules of Montana since 1989. Samples were taken in May of 1994 and analyzed for the assessment monitoring parameter list specified by ARM 16.14.706. Analytical results indicated that several volatile organic compounds (VOC's) were present in groundwater downgradient from the landfill at statistically significant concentrations above levels in upgradient wells. As a result, the Montana Department of Health and Environmental Sciences (MDHES) has required the City to undertake this assessment of potential corrective measures and to determine a preferred mitigative alternative which will be protective of human health and the environment.

1.1 PURPOSE AND ORGANIZATION OF REPORT

This report has been prepared in accordance with ARM 16.14.708, which provides the regulatory requirements for the Corrective Measures Assessment. In addition, this report

CORRECTIVE MEASURES ASSESSMENT

FOR THE HELIX LANDFILL

CITY OF HELIX

1. INTRODUCTION

The City of Helix has been monitoring the quality of groundwater at and near the Helix Landfill in the western portion of the City of Helix. The assessment of the Helix Landfill is the subject of the Administrative Rules of Helix (ARM) 16.14.708. The ARM 16.14.708 requires the City to conduct a corrective measures assessment at the Helix Landfill in accordance with the following criteria:

The City of Helix has been monitoring the quality of groundwater at and near the Helix Landfill as required by the Administrative Rules of Helix since 1989. Samples were taken in July of 1990 and analyzed for the assessment monitoring parameters as specified in ARM 16.14.708. Analytical results indicated that several volatile organic compounds (VOCs) were present in groundwater downgradient from the landfill in concentrations slightly above concentrations that are in compliance with. As a result, the Department of Health and Environmental Sciences (MHES) has required the City to undertake this assessment of potential corrective measures and to determine a preferred corrective measures which will be protective of human health and the environment.

1.1 PURPOSE AND ORGANIZATION OF REPORT

This report has been prepared in accordance with ARM 16.14.708, which requires the City to conduct a corrective measures assessment. In addition, this report

may be used to present the alternative selection process and selected alternative to concerned public citizens.

The remaining portion of Section 1.0 of this report presents a physical and hydrogeological description of the Helena Landfill, and a brief site history. Section 2.0 characterizes the extent and nature of contamination at the site. Section 3.0 presents the objectives of the selected corrective action. Section 4.0 details the identification and initial screening of corrective measure technologies. Section 5.0 is a description of the technologies which have passed initial screening and their assemblage into potential alternatives. Section 6.0 is a comprehensive evaluation of the applicable corrective alternatives as required by Administrative Rules of Montana, and Section 7.0 presents the preferred alternative and the justification for the selection of this alternative.

1.2 SITE DESCRIPTION

The Helena Landfill comprises three landfilled areas totaling approximately 37 acres and is located in T10N, R3W, Sections 19 and 30 (Figure 1-1). For the purpose of this CMA, the three landfilled areas at the site will be considered collectively. The Helena Landfill is bordered to the west by Carroll College and Elk River Concrete, to the north by Bill Roberts Municipal Golf Course, to the east by Memorial Park and to the south by Lyndale Avenue (Figure 1-2).

Figure 1-2 also shows the landfill area, including the City's property boundary, and the relative compliance boundary (RCB) for groundwater evaluation at the landfill. The RCB is defined in ARM 16.14.708 as 150 meters beyond the waste management unit boundary on land owned by the owner of the disposal unit.

1.3 SITE HISTORY

This area has been reportedly receiving municipal waste since the late 1800's when open burning was the primary disposal method. In 1970, sanitary landfill regulations were promulgated and all open burning ceased (EPA, 1989). The landfill was closed in 1994.

may be used to protect the shoreline against erosion and related shoreline up-
movement and/or collapse.

The remaining portion of Section 1.0 of this report presents a physical and
hydrogeological description of the Helena Landfill and a brief site history. Section 2.0
describes the extent and nature of contamination at the site. Section 3.0 presents the
objectives of the selected corrective action. Section 4.0 details the identification and
initial screening of corrective treatment technologies. Section 5.0 is a description of the
technologies which have passed initial screening and their associated and potential
alternatives. Section 6.0 is a comparison of evaluation in the applicable corrective
alternatives as required by Administrative Rules of Montana. Section 7.0 presents the
proposed alternatives and the justification for the selection of this alternative.

1.2 SITE DESCRIPTION

The Helena Landfill occupies three landfilled areas totaling approximately 17 acres and
is located in T10N, R3W, Section 19 and 20 (Figure 1-1). For the purpose of this LMA,
the three landfilled areas at the site will be considered collectively. The Helena Landfill
is bordered to the west by Canyon College and the River Course, to the north by Hill
Road, to the east by Helena Golf Course, to the east by Helena Park and to the south by
Helena Avenue (Figure 1-2).

Figure 1-3 also shows the landfill area including the City's property boundary and the
entire city limit boundary (CLB) for groundwater evaluation at the landfill. The
CLB is defined as 44N, 16E, 7E or 150 meters beyond the waste management unit
boundary as land owned by the owner at the landfill site.

1.3 SITE HISTORY

This area has been reportedly receiving municipal waste since the late 1800's when open
burning was the primary disposal method. In 1970, sanitary landfill regulations were
promulgated and all open burning ceased (BPA, 1989). The landfill was closed in 1984.



Proj. No: CHHL03
Dwg. No: 52895H01
Drawn By: 0083
Last Update: 2/2/95
Ref. Dwg:
Rev. Date:

Hydrometrics, Inc.

Figure 1-1

Vicinity Map

City of Helena Landfill
Helena, Montana



City of Houston
 Houston, Texas
 Figure 1-1
 Vicinity Map
 Hydrotechnics, Inc.
 Rev. 1/78
 Last Update 12/77
 Drawn By: [illegible]
 Proj. No. [illegible]



Legend

- Piezometer
- Monitoring Well
- Irrigation Well
- Domestic Well
- Infiltration Gallery
- Potentiometric Contour Lines (January 1995)
- General Direction of Groundwater Flow
- Relative Compliance Boundary
- Property Owned by the City of Helena

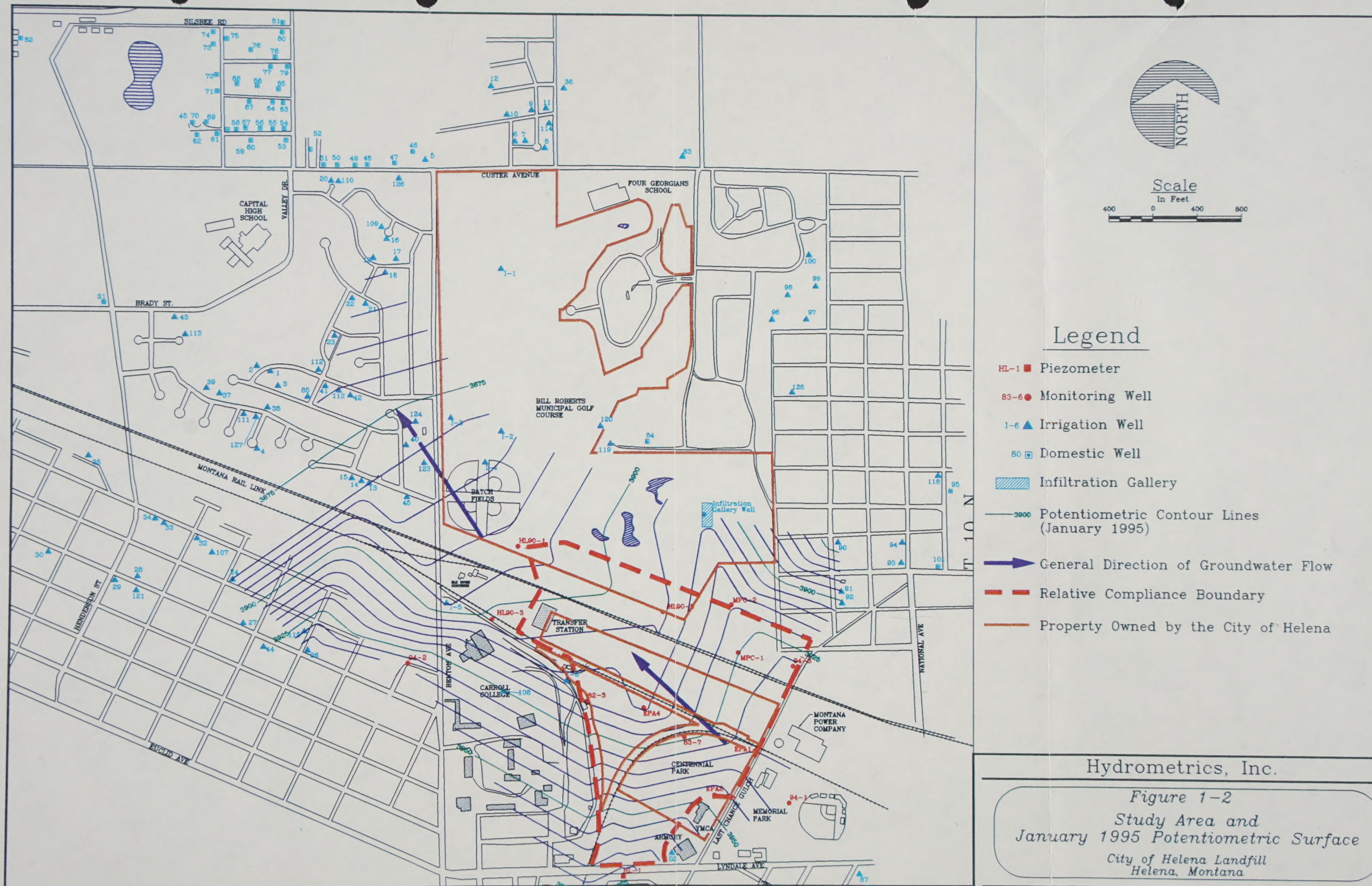
Hydrometrics, Inc.

Figure 1-2
Study Area and
January 1995 Potentiometric Surface
City of Helena Landfill
Helena, Montana



Figure 1-1
Locality Map
City of Helena, Montana
Helena, Montana

Hydrometrix, Inc.
1000 N. 1st St.
Helena, MT 59601
406/261-1111
Fax: 406/261-1112





Proj. No. 000000
Des. No. 000000
Scale 1:1000
Date 10/10/00

The sanitary landfill was in formal operation since the early 1970's and accepted an average of approximately 80 tons of domestic waste per day (Hydrometrics, 1991). Each of the three landfilled areas was operated independently and was closed as per the current Montana regulations during the closure period. Final closure of the newest landfill area and opening of the new transfer station took place in 1994.

1.4 HYDROGEOLOGIC SETTING

Several studies of hydrogeology and water quality have taken place at the site including EPA Field Investigative Team studies in 1987 and 1989, Hydrometrics in 1990 and F and M Consultants in 1982. The USGS has also conducted several studies of the Helena Valley hydrogeology.

The Helena Landfill lies at the mouth of Last Chance Gulch at the southern edge of the Helena Valley. The gulch in this area is underlain with quaternary and tertiary age alluvial deposits which are in contact with igneous bedrock which comprises the mound upon which Carroll College sits, and limestone deposits below the YMCA and Armory building (Figure 1-2).

The alluvial stream and fan deposits are composed of layers, lenses and mixtures of unconsolidated clay, silt, sand, gravel and cobbles (Coffin, 1971). The alluvial materials vary in origin with clasts of limestone and dolomite (Precambrian Helena Dolomite Formation) and Cretaceous intrusive igneous clasts being common. Alluvial fan and stream deposits were probably deposited by an interconnecting network of paleochannels which resulted in the heterogeneous alluvium at the mouth of Last Chance Gulch.

Much of the surficial alluvial deposits in the area have been extensively dredged and placer-mined for gold. The dredged material varies in thickness from 25 to 50 feet and is underlain by unconsolidated and semi-consolidated Tertiary sediments, and alluvium where the surficial deposits were too deep to excavate during the dredging process. The

The study area is in forest region about the early 1900's and situated in
 average of approximately 50 feet of historic waste per day (Hydrostatic, 1981). Each
 of the three identified areas was assessed independently and was closed as per the criteria
 of the study area. Final closure of the waste landfill was
 and opening of the new water supply took place in 1994.

1.4. HYDROLOGIC SETTING

Several studies of hydrology and water quality have taken place at the site including
 EPA Field Investigative Team studies in 1987 and 1989. Hydrologic data in 1989 and 1990 and
 M. O'Connell in 1982. The 1982 study also conducted several studies of the Hinton
 Valley hydrology.

The Hinton Valley is at the mouth of the Hinton Valley at the southern edge of the
 Hinton Valley. The valley in this area is underlain with granitic and volcanic age
 igneous deposits which are in contact with igneous bedrock which comprises the ground
 upon which Hinton College and Hinton Hospital are located. The Y.M.C.A. and Army
 Institute (Figure 1-2).

The Hinton Valley is a valley composed of layered, loose and relatively
 unconsolidated fine, sand, gravel and cobble (O'Connell, 1982). The alluvial materials
 vary in extent with extent of deposition and debris (O'Connell, 1982). The alluvial
 materials and Hinton Hospital are granitic and volcanic in origin. Alluvial fan and
 stream deposits are probably deposited by an intermittent network of ephemeral
 which resulted in the Hinton Valley stream in the mouth of the Hinton Valley.

Most of the surface alluvial deposits in the area have been extensively disturbed and
 have gained the soil. The bedrock material varies in thickness from 25 to 50 feet and is
 underlain by unconsolidated and semi-consolidated Tertiary sediment and volcanic
 where the surface deposits were too deep to excavate during the building process. The

tertiary sediments vary in thickness from relatively thin along the valley edges to several hundred feet in the center of the valley (Hydrometrics, 1982).

Groundwater at and near the Helena Landfill occurs in both the alluvium and the underlying bedrock. North of the landfill, groundwater also occurs in dredge piles left from historic mining activities, and in the semi-consolidated tertiary sediments. Because of the heterogeneous nature of the geology, most groundwater flow is likely through a complex network of higher permeable zones and layers.

An inventory of monitoring wells and private irrigation and domestic wells is shown on Table 1-1. These wells are shown on Figure 1-2 which also contains a potentiometric map showing the groundwater table during January, 1995. Groundwater flow in the landfill area is generally north/northwest with an average hydraulic gradient of about 0.03 ft/ft. Depth to groundwater across the landfill area varies from approximately 20 to 50 feet. Groundwater velocity in the vicinity of the landfill is estimated at 2 to 3 feet per day (Hydrometrics, 1990).

A more detailed description of the Helena Landfill hydrogeology is contained in "Hydrogeologic Investigation of the City of Helena Landfill" (Hydrometrics, 1990).

terrestrial sediments vary in thickness from relatively thin along the valley edges to several hundred feet in the center of the valley (Hydrogeology, 1990).

Groundwater is not near the Hagerman landfill center in both the alluvium and the underlying basalt. North of the landfill, groundwater also occurs in basalt plate but from fracture-related features and in the semi-consolidated tertiary sediments. Because of the heterogeneous nature of the geologic mass, groundwater flow is likely through a complex network of higher permeable zones and layers.

Advancement of monitoring wells and future delineation and definition wells is shown on Table 1-1. These wells are shown on Figure 1-2 which also contains a potentiometric map showing the groundwater table during January, 1992. Groundwater flow in the landfill area is generally northwesterly with an average hydraulic gradient of about 0.03 ft/ft. It will be noted that within the landfill area, water flows approximately 20 to 30 feet. Groundwater velocity in the vicinity of the landfill is estimated at 2 to 3 feet per day.

(Hydrogeology, 1990)

A more detailed description of the landfill hydrogeology is contained in the Hydrogeologic Investigation of the City of Hagerman (Hydrogeology, 1990).

TABLE 1-1: HELENA LANDFILL AREA WELL INVENTORY - JANUARY 1995

WELL NUMBER	ADDRESS	OWNER	DEPTH	PERFORATED ZONE
1	230 Meadow Dr.	G. Amestoy	100	---
2	233 Meadow Dr.	C. Colarchic	---	---
3	227 Greenwood	A. Holzwarth	---	44-64
4	5 Deborah Ct.	T. Johnson	100	---
5	350 Custer Ave.	S. Colvin	80	60-80
6	3119 Bridger	J. Garman	100	70-100
7	454 Vigilante	R. Stenquist	51	---
8	3107 Vigilante	C. Knutson	101	80-100
9	3130 Vigilante	C. Tielking	61	---
10	448 Russell	L. Peterman	---	---
11	472 Russell	J. Zimmerman	---	---
12	448 Paxon	M. Parriman	68	60-68
13	102 Oakwood	E. Johnson	118	78-118
14	104 Oakwood	K. Rogers	115	70-110
15	106 Oakwood	E. Darfler	140	90-140
16	3 Parr Court	C. Tilzey	65	54-64
17	105 Wedgewood	F. Robinson	---	---
18	108 Wedgewood	B. Hartman	---	---
19	119 Wedgewood	D. Clark	115	90-115
20	3 Terry Court	H. Peterson	120	80-120
21	146 Briarwood	R. Karp	52	12-52
22	154 Briarwood	R. Burger	---	---
23	114 Ridgewood	T. Berry	75	55-75
24	1130 Waukesha	E. Johnson	180	100-180
25	1703 Waukesha	M. Carmichael	---	---
26	932 Peosta	G. Daly	300	---
27	1110 Peosta	S. McCann	360	---
28	1314 Peosta	M. Johnson	278	170-270
29	1331 Peosta	R. Guse	300	120-290
30	1611 Peosta	R. Brohman	135	---
31	1430 Brady	D. Gardner	101	75-95
32	1815 Brady	W. Routzahn	220	140-220
33	1317 Hudson	C. Engstedt	---	---
34	1325 Hudson	K. Erickson	118	78-118
35	1427 Broadwater Cir.	Broadwater Vill.	215	95-215
36	3203 Cooney	Kalamity Bros.	45	38-45
37	235 Anderson Blvd.	G. South	100	40-100
38	227 Anderson Blvd.	T. Tillo	100	40-100
39	239 Anderson Blvd.	W. Kotan	82	58-82

--- No Information, Inventory based on DNRC and City of Helena Records.

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TABLE 1. HELINA LAKE AREA WELL INVENTORY - JANUARY 1988

WELL NUMBER	ADDRESS	OWNER	DEPTH	TESTED DATE
1	210 Meadow Dr.	J. Amberg	100	
2	212 Meadow Dr.	C. Colclough		
3	214 Greenwood	A. Holmberg		4-84
4	2 Dakota Ct.	J. Johnson	100	
5	330 Cedar Ave.	S. Colclough	80	6-80
6	3116 Birch	E. Quinn	100	7-100
7	414 Virginia	R. Stegman	51	
8	3107 Virginia	C. Koutos	101	8-100
9	3150 Virginia	C. Treibig	81	
10	448 Russell	L. Robinson		
11	452 Russell	J. Zimmerman		
12	444 Birch	M. Robinson	68	6-82
13	102 Oakwood	E. Johnson	118	7-118
14	104 Oakwood	A. Rogers	113	7-113
15	104 Oakwood	E. Puffer	140	9-140
16	104 Oakwood	C. Thayer	63	7-63
17	102 Woodwood	R. Robinson		
18	104 Woodwood	R. Hansen		
19	118 Woodwood	D. Clark	114	9-114
20	118 Woodwood	A. Johnson	120	8-120
21	140 Woodwood	R. Karp	83	12-83
22	154 Woodwood	R. Karp		
23	114 Woodwood	T. Burt	75	4-75
24	1150 Woodwood	E. Johnson	180	10-180
25	1700 Woodwood	M. Campbell		
26	912 Forest	G. Day	100	
27	1710 Forest	S. McCann	108	
28	1714 Forest	M. Johnson	278	170-270
29	1731 Forest	R. Guss	300	170-290
30	1817 Forest	R. Robinson	133	
31	1810 Birch	D. Gander	101	7-93
32	1812 Birch	M. Koutos	230	140-230
33	1813 Birch	C. Engstrom		
34	1822 Birch	E. Johnson	118	7-118
35	1457 Woodwood	Woodward Hill	212	95-212
36	2202 Cherry	Woodward Hill	43	3-43
37	222 Anderson Blvd.	G. Guss	100	40-100
38	222 Anderson Blvd.	T. Tille	100	40-100
39	222 Anderson Blvd.	W. Koutos	87	2-87

TABLE 1-1: HELENA LANDFILL AREA WELL INVENTORY - JANUARY 1995

40	2509 Teakwood	E. Hartman	70	50-70
41	124 Meadow	Strasko	73	53-73
42	112 Meadow	W. Hill	72	52-72
43	246 Brady	Frisch	80	40-80
44	1023 Peosta	Cumley	65	55-65
45	94 Oakwood	Hanson	116	---
46	320 Custer	Colvin	---	---
47	328 Custer	Robinson	---	---
48	308 Custer	C.A. Barbeau	79	---
49	304 Custer	---	---	---
50	226 Custer	---	---	---
51	220 Custer	E. Hartze	64	---
52	Custer & Grn. Meadow	---	---	---
53	121 Dunbar	G. Kercher	---	---
54	122 Dunbar	S. Hitchcock	67	57-67
55	114 Dunbar	---	---	---
56	112 Dunbar	G. Francis	54	---
57	108 Dunbar	Bacon	---	---
58	106 Dunbar	---	---	---
59	100,102 Dunbar	Stolp	---	---
60	No Address - Trailers	---	---	---
61	78 Dunbar	J. Hayes	72	---
62	76 Dunbar	J. Bridges	80	60-80
63	110 Willow	G. Milairn	---	---
64	121 Willow	B. Bonogofsky	82	58-82
65	110 Willow	Pool	85	---
66	108 Willow	---	---	---
67	105 Willow	O'Neal	100	60-100
68	104 Willow	J. Creach	80-100	---
69	19 Willow	Horsecienda Hotel	---	---
70	11 Willow	Gardner	55	---
71	3204 Mitchell	Chamberlain	---	---
72	3208 Mitchell	Hall	---	---
73	3212 Mitchell	Tovey	72	52-72
74	3216 Mitchell	Allison	---	---
75	104 Reed	J. Creach	70	22-70
76	Trailer Court on Reed	---	---	---
77	115 Reed	---	---	---
78	120 Reed	W. Cole	50	42-50
79	SW Corner Grn Mdw/Reed	---	---	---
80	3280 Green Meadow	Trails West	---	---

--- No Information, Inventory based on DNRC and City of Helena Records.

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TABLE 1. HENNA MILL AREA WELL INVENTORY - JANUARY 1992

40	100 Testwood	B. Hannan	30-50
41	104 Testwood	B. Hannan	31-32
42	112 Testwood	W. Hill	33-34
43	106 Testwood	B. Hannan	35-36
44	102 Testwood	B. Hannan	37-38
45	108 Testwood	B. Hannan	39-40
46	110 Testwood	B. Hannan	41-42
47	114 Testwood	B. Hannan	43-44
48	116 Testwood	B. Hannan	45-46
49	118 Testwood	B. Hannan	47-48
50	120 Testwood	B. Hannan	49-50
51	122 Testwood	B. Hannan	51-52
52	124 Testwood	B. Hannan	53-54
53	126 Testwood	B. Hannan	55-56
54	128 Testwood	B. Hannan	57-58
55	130 Testwood	B. Hannan	59-60
56	132 Testwood	B. Hannan	61-62
57	134 Testwood	B. Hannan	63-64
58	136 Testwood	B. Hannan	65-66
59	138 Testwood	B. Hannan	67-68
60	140 Testwood	B. Hannan	69-70
61	142 Testwood	B. Hannan	71-72
62	144 Testwood	B. Hannan	73-74
63	146 Testwood	B. Hannan	75-76
64	148 Testwood	B. Hannan	77-78
65	150 Testwood	B. Hannan	79-80
66	152 Testwood	B. Hannan	81-82
67	154 Testwood	B. Hannan	83-84
68	156 Testwood	B. Hannan	85-86
69	158 Testwood	B. Hannan	87-88
70	160 Testwood	B. Hannan	89-90
71	162 Testwood	B. Hannan	91-92
72	164 Testwood	B. Hannan	93-94
73	166 Testwood	B. Hannan	95-96
74	168 Testwood	B. Hannan	97-98
75	170 Testwood	B. Hannan	99-100
76	172 Testwood	B. Hannan	101-102
77	174 Testwood	B. Hannan	103-104
78	176 Testwood	B. Hannan	105-106
79	178 Testwood	B. Hannan	107-108
80	180 Testwood	B. Hannan	109-110
81	182 Testwood	B. Hannan	111-112
82	184 Testwood	B. Hannan	113-114
83	186 Testwood	B. Hannan	115-116
84	188 Testwood	B. Hannan	117-118
85	190 Testwood	B. Hannan	119-120
86	192 Testwood	B. Hannan	121-122
87	194 Testwood	B. Hannan	123-124
88	196 Testwood	B. Hannan	125-126
89	198 Testwood	B. Hannan	127-128
90	200 Testwood	B. Hannan	129-130
91	202 Testwood	B. Hannan	131-132
92	204 Testwood	B. Hannan	133-134
93	206 Testwood	B. Hannan	135-136
94	208 Testwood	B. Hannan	137-138
95	210 Testwood	B. Hannan	139-140
96	212 Testwood	B. Hannan	141-142
97	214 Testwood	B. Hannan	143-144
98	216 Testwood	B. Hannan	145-146
99	218 Testwood	B. Hannan	147-148
100	220 Testwood	B. Hannan	149-150

TABLE 1-1: HELENA LANDFILL AREA WELL INVENTORY - JANUARY 1995

81	3300 Green Meadow	G. M. Market	---	---
82	County Fairgrounds	Fairgrounds	---	---
83	610 W. Custer	AAA Car Wash	---	---
84	500 Cole Ave.	---	---	---
85	210 Harwood	Ralston	75	15-75
86	15 Reed	C. Bryant	72	---
87	1055 N. Warren	Peterson	---	---
90	2131 Villard	K. Collins	---	---
91	2009 Villard	P. Higgins	---	---
92	2005 Villard	P. Rowsey	---	---
93	932 Aspen	R. Hecht	---	---
94	933 Cedar	N. Swanson	---	---
HL-90-1	Helena Landfill Area	City of Helena	60	40-60
HL-90-2	Helena Landfill Area	City of Helena	68	60-68
HL-90-3	Helena Landfill Area	City of Helena	79	59-79
83-6	Helena Landfill Area	City of Helena	25	19-23
83-7	Helena Landfill Area	City of Helena	40	32-37
82-1	Helena Landfill Area	City of Helena	40	14-34
82-2	Helena Landfill Area	City of Helena	43	23-43
82-3	Helena Landfill Area	City of Helena	83	43-83
82-4	Helena Landfill Area	City of Helena	79	44-74
HL-1	Helena Landfill Area	EPA	---	---
HL-2	Helena Landfill Area	EPA	---	---
HL-5	Helena Landfill Area	EPA	---	---
HL-6	Helena Landfill Area	EPA	---	---
HL-7	Helena Landfill Area	EPA	---	---
EPA1	Helena Landfill Area	EPA	54.5	39.5-54.5
EPA2	Helena Landfill Area	EPA	55.1	40.1-55.1
EPA3	Helena Landfill Area	EPA	95	85-95
EPA4	Helena Landfill Area	EPA	76.2	66.2-76.2
I-1	Bill Roberts Golf Course	Golf Course	146	35-95
I-2	Bill Roberts Golf Course	Golf Course	---	---
I-3	Bill Roberts Golf Course	Golf Course	220	71-170 (Zones)
I-4	Bill Roberts Golf Course	Batch Fields	156	60-156
I-5	Bill Roberts Golf Course	Carroll College	550	100-550
I-6	Bill Roberts Golf Course	Carroll College	320	100-320
Inf. Gall.	Bill Roberts Golf Course	Golf Course	---	---
95	2315 Dodge Ave.	E. McHugh	---	---
96	3000 Villard	McHugh Mobile Home	---	---
97	3000 Villard	McHugh Mobile Home	---	---
98	3000 Villard	McHugh Mobile Home	---	---

--- No Information, Inventory based on DNRC and City of Helena Records.

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TABLE 1-1 HELINA LANDFILL AREA WASTE INVENTORY - JANUARY 1988

81	300 Green Meadows	H.O.M. Mobile		
82	County Fairgrounds	Paints		
83	610 W. Green	AAA Car Wash		
84	300 Cole Ave			
85	210 Elmwood	Relaxer	12-75	12-75
86	14 Road	E. Brown	75	
87	1605 N. Wilson	Footwear		
88	2101 Village	R. Collins		
89	2000 Village	V. Higgins		
90	2000 Village	P. Rowley		
91	901 Aspen	P. Smith		
92	901 Cedar	W. Jackson		
HE-90-1	Helina Landfill Area	City of Helina	60	40-60
HE-90-2	Helina Landfill Area	City of Helina	60	60-80
HE-90-3	Helina Landfill Area	City of Helina	70	90-100
HE-90-4	Helina Landfill Area	City of Helina	25	10-25
HE-90-5	Helina Landfill Area	City of Helina	40	30-40
HE-90-6	Helina Landfill Area	City of Helina	40	20-40
HE-90-7	Helina Landfill Area	City of Helina	60	30-60
HE-90-8	Helina Landfill Area	City of Helina	80	40-80
HE-90-9	Helina Landfill Area	City of Helina	70	40-70
HE-90-10	Helina Landfill Area	EPA		
HE-90-11	Helina Landfill Area	EPA		
HE-90-12	Helina Landfill Area	EPA		
HE-90-13	Helina Landfill Area	EPA		
HE-90-14	Helina Landfill Area	EPA		
HE-90-15	Helina Landfill Area	EPA	24.2	10-24.2
HE-90-16	Helina Landfill Area	EPA	24.1	10-24.1
HE-90-17	Helina Landfill Area	EPA	95	40-95
HE-90-18	Helina Landfill Area	EPA	100	60-100
HE-90-19	Helina Landfill Area	Goil Course	100	20-100
HE-90-20	Helina Landfill Area	Goil Course		
HE-90-21	Helina Landfill Area	Goil Course	220	70-220 (2000)
HE-90-22	Helina Landfill Area	Goil Course	150	40-150
HE-90-23	Helina Landfill Area	Goil Course	350	100-350
HE-90-24	Helina Landfill Area	Goil Course	350	100-350
HE-90-25	Helina Landfill Area	Goil Course		
HE-90-26	Helina Landfill Area	E. McHugh		
HE-90-27	Helina Landfill Area	McHugh Mobile Home		
HE-90-28	Helina Landfill Area	McHugh Mobile Home		
HE-90-29	Helina Landfill Area	McHugh Mobile Home		

TABLE 1-1: HELENA LANDFILL AREA WELL INVENTORY - JANUARY 1995

99	3000 Villard	McHugh Mobile Home	---	---
100	3000 Villard	McHugh Mobile Home	---	---
101	2101 N. Montana	---	---	---
102	1100 N. Main	Military Affairs	---	---
103	1624 Hollins	---	---	---
104	1701 Hollins	---	---	---
105	1716 Hollins	---	---	---
107	1215 Hudson	S. Puhek	---	---
108	1977 N. Benton	Carroll College	---	---
109	2 Parr Crt.	J. Mc Cabe	---	---
110	2 Terry Crt.	L. Williams	---	---
111	8 Rebecca Crt.	D. Tillo	---	---
112	116 Meadow Dr.	B. Armstrong	---	---
113	244 Hartley	T. Hurtle	---	---
114	3115-15 Vigilante Dr.	J. Willard	---	---
115	1718 Lincoln	H. Pembroke	---	---
116	1019 Logan	E.M. Netzer	---	---
117	1019 Logan	E.M. Netzer	---	---
118	1029 Cole Ave.	D. Alm	---	---
119	300 Cole Ave.	L. Palmer	---	---
120	300 Cole Ave.	L. Palmer	---	---
121	1311 Peosta	L. Lloyd	---	---
122	1800 Wilder	R. Link	---	---
123	2190 N. Benton	B. Hainlin	---	---
124	2200 N. Benton	J. Mc Kinnon	---	---
125	718 Orange	R. Glueckert	---	---
126	603 Custer	Video Playtime	---	---
127	1 Deborah Crt.	R. Grovom	---	---

--- No Information, Inventory based on DNRC and City of Helena Records.

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TABLE 1-1: HELINA LANDFILL AREA WELL INVENTORY - JANUARY 1993

99	2000 Vland	Michigan Mobile Home	
100	2000 Vland	Michigan Mobile Home	
101	2101 N. Main		
102	1100 N. Main	Library Annex	
103	1614 Taylor		
104	1701 Taylor		
105	1716 Hollins		
106	1215 Jackson		
107	1001 N. Benton	Lincoln College	
108	2 Park Dr	Lincoln College	
109	1 Park Dr	Lincoln College	
110	1 Park Dr	Lincoln College	
111	1 Park Dr	Lincoln College	
112	110 Madison Dr	H. Armstrong	
113	110 Madison Dr	H. Armstrong	
114	110 Madison Dr	H. Armstrong	
115	110 Madison Dr	H. Armstrong	
116	110 Madison Dr	H. Armstrong	
117	110 Madison Dr	H. Armstrong	
118	110 Madison Dr	H. Armstrong	
119	110 Madison Dr	H. Armstrong	
120	110 Madison Dr	H. Armstrong	
121	110 Madison Dr	H. Armstrong	
122	110 Madison Dr	H. Armstrong	
123	110 Madison Dr	H. Armstrong	
124	110 Madison Dr	H. Armstrong	
125	110 Madison Dr	H. Armstrong	
126	110 Madison Dr	H. Armstrong	
127	110 Madison Dr	H. Armstrong	
128	110 Madison Dr	H. Armstrong	
129	110 Madison Dr	H. Armstrong	
130	110 Madison Dr	H. Armstrong	
131	110 Madison Dr	H. Armstrong	
132	110 Madison Dr	H. Armstrong	
133	110 Madison Dr	H. Armstrong	
134	110 Madison Dr	H. Armstrong	
135	110 Madison Dr	H. Armstrong	
136	110 Madison Dr	H. Armstrong	
137	110 Madison Dr	H. Armstrong	
138	110 Madison Dr	H. Armstrong	
139	110 Madison Dr	H. Armstrong	
140	110 Madison Dr	H. Armstrong	
141	110 Madison Dr	H. Armstrong	
142	110 Madison Dr	H. Armstrong	
143	110 Madison Dr	H. Armstrong	
144	110 Madison Dr	H. Armstrong	
145	110 Madison Dr	H. Armstrong	
146	110 Madison Dr	H. Armstrong	
147	110 Madison Dr	H. Armstrong	
148	110 Madison Dr	H. Armstrong	
149	110 Madison Dr	H. Armstrong	
150	110 Madison Dr	H. Armstrong	
151	110 Madison Dr	H. Armstrong	
152	110 Madison Dr	H. Armstrong	
153	110 Madison Dr	H. Armstrong	
154	110 Madison Dr	H. Armstrong	
155	110 Madison Dr	H. Armstrong	
156	110 Madison Dr	H. Armstrong	
157	110 Madison Dr	H. Armstrong	
158	110 Madison Dr	H. Armstrong	
159	110 Madison Dr	H. Armstrong	
160	110 Madison Dr	H. Armstrong	
161	110 Madison Dr	H. Armstrong	
162	110 Madison Dr	H. Armstrong	
163	110 Madison Dr	H. Armstrong	
164	110 Madison Dr	H. Armstrong	
165	110 Madison Dr	H. Armstrong	
166	110 Madison Dr	H. Armstrong	
167	110 Madison Dr	H. Armstrong	
168	110 Madison Dr	H. Armstrong	
169	110 Madison Dr	H. Armstrong	
170	110 Madison Dr	H. Armstrong	
171	110 Madison Dr	H. Armstrong	
172	110 Madison Dr	H. Armstrong	
173	110 Madison Dr	H. Armstrong	
174	110 Madison Dr	H. Armstrong	
175	110 Madison Dr	H. Armstrong	
176	110 Madison Dr	H. Armstrong	
177	110 Madison Dr	H. Armstrong	
178	110 Madison Dr	H. Armstrong	
179	110 Madison Dr	H. Armstrong	
180	110 Madison Dr	H. Armstrong	
181	110 Madison Dr	H. Armstrong	
182	110 Madison Dr	H. Armstrong	
183	110 Madison Dr	H. Armstrong	
184	110 Madison Dr	H. Armstrong	
185	110 Madison Dr	H. Armstrong	
186	110 Madison Dr	H. Armstrong	
187	110 Madison Dr	H. Armstrong	
188	110 Madison Dr	H. Armstrong	
189	110 Madison Dr	H. Armstrong	
190	110 Madison Dr	H. Armstrong	
191	110 Madison Dr	H. Armstrong	
192	110 Madison Dr	H. Armstrong	
193	110 Madison Dr	H. Armstrong	
194	110 Madison Dr	H. Armstrong	
195	110 Madison Dr	H. Armstrong	
196	110 Madison Dr	H. Armstrong	
197	110 Madison Dr	H. Armstrong	
198	110 Madison Dr	H. Armstrong	
199	110 Madison Dr	H. Armstrong	
200	110 Madison Dr	H. Armstrong	

2.0 CONTAMINANT ASSESSMENT

This section characterizes the extent and degree of groundwater contamination present at and downgradient from the landfill site. Individual summaries which comprise a thorough characterization of potentially hazardous substances and the associated risks include:

- Groundwater Protection Standards
- Contaminants of Concern
- Contaminant Fate and Transport
- Risk to Human Health and the Environment

2.1 NATURE AND EXTENT OF CONTAMINATION

The City of Helena has performed extensive groundwater monitoring to determine the nature and extent of groundwater contamination associated with the landfill. An initial hydrogeological characterization was presented in 1990 (Hydrometrics, 1990). Several corrective measures have already been implemented by the City since submission of the initial characterization (i.e., closing of the landfill, clay cover on newest landfilled area, and extension of the storm drain north of the landfill). Therefore, the characterization of the nature and extent of contamination presented in this summary focuses on the most recent data obtained during the four sampling events in 1994.

Four separate sampling events were conducted during 1994. Samples were collected from 27 wells, four of which are either up-gradient or cross-gradient from the landfill area. Groundwater samples collected were analyzed for over 250 chemical constituents potentially found in landfill leachate. Sample results indicated a detection of 24 potential Table 1 or Table 2 (ARM 16.14.706) contaminants. Table 2-1 lists the maximum concentration of each constituent detected during 1994. Of the 27 wells sampled, 21 chemicals were detected in six or fewer wells. Three volatile organic compounds (VOCs) were detected in 14 or more wells:

- chloroform,
- dichlorodifluoromethane,
- tetrachloroethene.

CONTAMINANT ASSESSMENT

This section characterizes the extent and degree of groundwater contamination in areas adjacent to the landfill site. Individual constituents which comprise a thorough characterization of potentially hazardous substances and the associated risks

- Risk to Human Health and the Environment
- Contaminant Fate and Transport
- Contaminant of Concern
- Groundwater Protection Strategy

1.1. NATURE AND EXTENT OF CONTAMINATION

The City of Houston has performed extensive groundwater monitoring to determine the nature and extent of groundwater contamination associated with the landfill. An initial hydrogeological investigation was completed in 1990 (Hydroscience, 1990). Several corrective measures have already been implemented by the City since submission of the initial characterization (i.e. closing of the landfill, clay cover on newest landfill cell and extension of the storm drain north of the landfill). Therefore, the characterization of the nature and extent of contamination presented in this summary focuses on the most recent data obtained during the 1994 sampling event in 1994.

Four separate sampling events were completed during 1994. Samples were collected from 21 wells, four of which are either abandoned or cross paths from the landfill area. Groundwater samples collected were analyzed for over 250 chemical constituents potentially listed in landfill leachate. Sample results indicated a detection of 14 potential constituents of each constituent detected during 1994. Of the 21 wells sampled, 21 chemicals were detected in six or fewer wells. These volatile organic compounds (VOCs) were detected in 14 or more wells:

- Ethanol
- Ethanolamine
- Ethanolamine

Parameter	Montana MCL (mg/L)	Maximum Detection (mg/L)	Up-grad		Boundary							
			83-6 (mg/L)	HL-94 (mg/L)	52 (mg/L)	57 (mg/L)	59 (mg/L)	62 (mg/L)	75 (mg/L)	84 (mg/L)	93 (mg/L)	96 (mg/L)
Arsenic	0.05	0.0070	nd	nd	-	-	-	-	-	-	-	-
Barium	2.0	0.1000	nd	nd	-	-	-	-	-	-	-	-
Iron	na	0.0900	0.0900	nd	-	-	-	-	-	-	-	-
Selenium	0.05	0.0270	nd	nd	-	-	-	-	-	-	-	-
Zinc	na	0.1500	0.0300	nd	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.2000	0.0041	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.0070	0.0073	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.0050	0.0028	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	na	0.0170	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bromoform	na	0.0150	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Carbon Disulfide	na	0.0021	nd	nd	nd	0.0021	nd	nd	nd	nd	nd	nd
Chloroform	na	0.0620	0.0014	0.0042	0.0051	0.0018	0.0015	0.0071	nd	nd	nd	nd
Cis-1,2-Dichloroethene	0.0700	0.0024	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	na	0.0290	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dichlorodifluoromethane	na	0.0044	nd	nd	0.0014	0.0012	0.0013	0.0022	nd	nd	nd	nd
Methylene Chloride	na	0.0021	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	0.0050	0.0410	nd	nd	0.0019	0.0015	0.0014	0.0027	nd	nd	nd	nd
Toluene	1.0000	0.0062	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	0.0050	0.0031	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	na	0.0030	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trans-1,4-Dichloro-2-Butene	na	0.0020	nd	nd	-	nd	nd	nd	nd	nd	nd	nd
Bis (2-ethylhexyl) Phthalate	0.0060	0.0100	nd	0.0100	-	-	-	-	-	-	-	-
Cyanide	na	0.0470	nd	nd	-	-	-	-	-	-	-	-
Sulfide	na	0.0400	nd	nd	-	-	-	-	-	-	-	-

Parameters in **bold** indicate results higher than Montana MCL

na Not applicable

nd Not detected

- Not analyzed

TABLE 2-1
MAXIMUM DETECTION FOR WELLS SAMPLED DURING 1994

Parameter	Montana	Maximum	Up-gradient			Cross-gradient	Inside Relative Compliance Boundary					Outside Relative Compliance Boundary																			
	MCL (mg/L)	Detection (mg/L)	83-6 (mg/L)	HL-94-1 (mg/L)	HL-94-2 (mg/L)	28 (mg/L)	EPA1 (mg/L)	MPC-1 (mg/L)	MPC-2 (mg/L)	HL-90-1 (mg/L)	HL-90-2 (mg/L)	I-1 (mg/L)	I-2 (mg/L)	I-3 (mg/L)	HL-90-3 (mg/L)	HL-94-3 (mg/L)	5 (mg/L)	13 (mg/L)	31 (mg/L)	40 (mg/L)	45 (mg/L)	51 (mg/L)	52 (mg/L)	57 (mg/L)	59 (mg/L)	62 (mg/L)	75 (mg/L)	84 (mg/L)	93 (mg/L)	96 (mg/L)	
Arsenic	0.05	0.0070	nd	nd	0.0070	-	nd	nd	-	nd	nd	-	-	-	nd	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	2.0	0.1000	nd	nd	nd	-	0.1000	nd	-	nd	nd	-	-	-	0.1000	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	na	0.0900	0.0900	nd	nd	-	nd	nd	-	nd	0.0300	-	-	-	nd	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.05	0.0270	nd	nd	0.0270	-	nd	nd	-	nd	nd	-	-	-	nd	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	na	0.1500	0.0300	nd	nd	-	0.0200	0.0200	-	0.0900	0.1500	-	-	-	0.0700	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.2000	0.0041	nd	nd	nd	nd	nd	nd	nd	0.0041	nd	nd	nd	0.0017	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.0070	0.0073	nd	nd	nd	nd	0.0036	0.0073	nd	0.0028	0.0032	nd	nd	nd	0.0010	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.0050	0.0028	nd	nd	nd	nd	0.0028	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	na	0.0170	nd	nd	nd	0.0170	nd	nd	nd	nd	nd	nd	0.0011	nd	nd	0.0012	nd	nd	nd	nd	0.0015	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bromoform	na	0.0150	nd	nd	nd	0.0150	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Carbon Disulfide	na	0.0021	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0012	nd	nd	0.0021	nd	nd	nd	nd	nd	nd	nd
Chloroform	na	0.0620	0.0014	0.0042	0.0620	0.0130	0.0061	0.0025	nd	0.0035	nd	nd	0.0430	0.0026	0.0047	0.0130	0.0016	0.0062	0.0080	0.0057	0.0200	0.0047	0.0051	0.0018	0.0015	0.0071	nd	nd	nd	nd	
Cis-1,2-Dichloroethene	0.0700	0.0024	nd	nd	nd	nd	0.0010	0.0018	nd	nd	nd	nd	nd	nd	0.0024	nd	nd	nd	nd	0.0014	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	na	0.0290	nd	nd	nd	0.0290	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dichlorodifluoromethane	na	0.0044	nd	nd	nd	nd	0.0044	0.0034	nd	0.0038	0.0013	nd	0.0018	0.0030	nd	nd	nd	0.0022	nd	0.0020	nd	0.0022	0.0014	0.0012	0.0013	0.0022	nd	nd	nd	nd	
Methylene Chloride	na	0.0021	nd	nd	nd	nd	nd	nd	nd	0.0021	nd	nd	nd	0.0012	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	0.0050	0.0410	nd	nd	nd	0.0052	0.0410	0.0130	nd	0.0200	nd	nd	0.0013	0.0042	0.0019	nd	0.0012	0.0032	nd	0.0051	0.0016	0.0016	0.0019	0.0015	0.0014	0.0027	nd	nd	nd	nd	
Toluene	1.0000	0.0062	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0013	0.0042	nd	nd	nd	0.0062	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	0.0050	0.0031	nd	nd	nd	nd	0.0022	0.0031	nd	0.0020	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	na	0.0030	nd	nd	nd	nd	0.0030	0.0020	nd	0.0014	nd	nd	nd	0.0015	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Trans-1,4-Dichloro-2-Butene	na	0.0020	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.0020	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	
Bis (2-ethylhexyl) Phthalate	0.0060	0.0100	nd	0.0100	nd	-	nd	nd	-	nd	nd	-	-	-	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cyanide	na	0.0470	nd	nd	nd	-	nd	0.0400	-	nd	nd	-	-	-	nd	0.0470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfide	na	0.0400	nd	nd	nd	-	nd	0.0400	-	nd	nd	-	-	-	nd	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Parameters in **bold** indicate results higher than Montana MCL

na Not applicable

nd Not detected

- Not analyzed

Figure 2-1 presents an isoconcentration map of chloroform within the area of the sampled wells. Review of this data clearly indicate that chloroform concentrations in groundwater are widespread and appear to originate from an area southwest of Carroll College. The groundwater in this area is hydraulically up-gradient and/or cross-gradient to the landfill. Chloroform discovered throughout the study area does not appear to originate from the landfill.

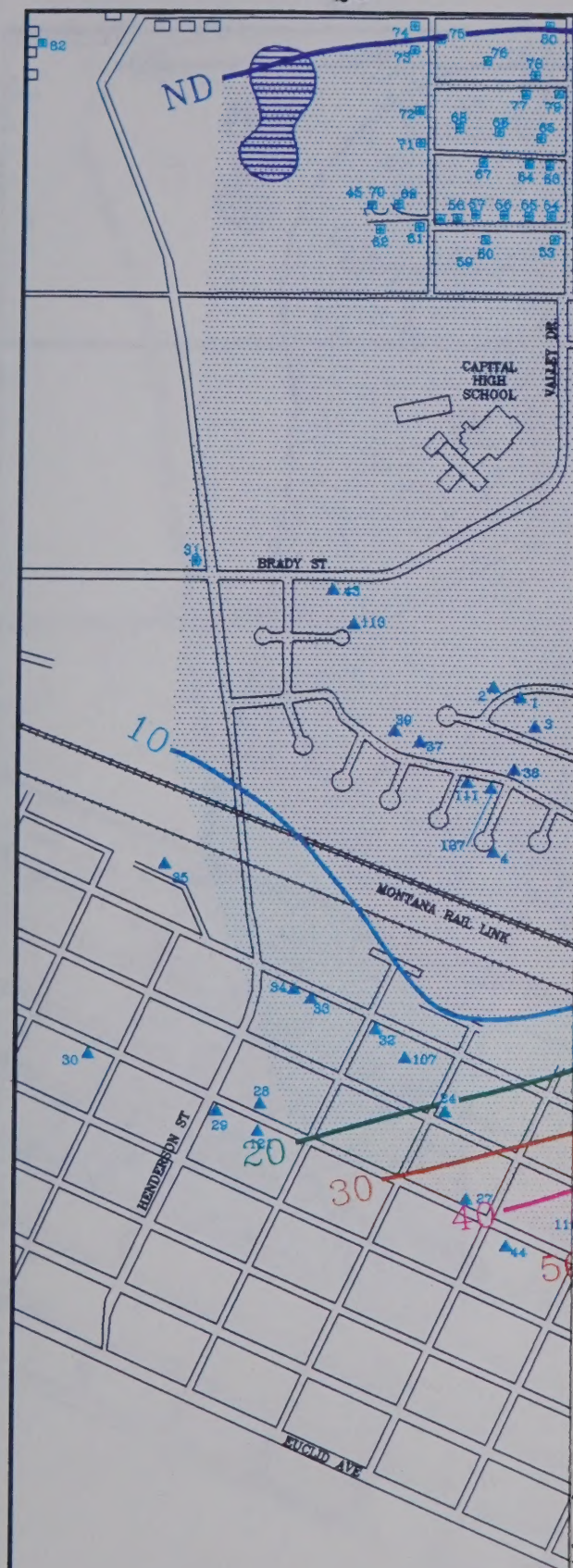
Tetrachloroethene was detected in 21 of the 27 wells and was present in all but one well where dichlorodifluoromethane was detected, monitoring well HL-90-2 which is immediately adjacent and down-gradient to the landfill area. Tetrachloroethene is also known as perchloroethylene (PCE). Figure 2-2 is an isoconcentration map showing the areal distribution of tetrachloroethene in groundwater near the Helena Landfill. Review of the sampling data from Table 2-1 and the isoconcentration map demonstrate that tetrachloroethene is the predominant chemical impacting groundwater in the area. Therefore, the magnitude and extent of the tetrachloroethene plume will be used throughout this assessment to represent groundwater quality near the site. This plume includes all areas where any VOCs attributable to Helena Landfill have been detected. Although the PCE plume presented in Figure 2-2 covers a large areal extent (365 acres), concentrations of tetrachloroethene are relatively low and only slightly above the federal Maximum Contaminant Level (MCL) of 5 µg/L. The total volume of tetrachloroethene dissolved in a 365 acre 50-foot deep plume at concentrations represented by Figure 2-2 is approximately 7 gallons.

Tetrachloroethene is a dense non-aqueous phase liquid (DNAPL) and would sink to the bottom of an aquifer is present as a free-phase liquid. Several wells were completed in the lower reaches of the aquifer and none indicated that tetrachloroethene exists as a free-phase liquid in this area. Tetrachloroethene has a solubility of 1,100 mg/L at 20 °C and would likely be detected at concentrations significantly higher than those observed if present as a phase separated liquid. This observation indicates that tetrachloroethene is likely entering the groundwater as an aqueous solution present in landfill leachate. This

Figure 2-1 presents an isopleth map of chloroform within the site of the sampling wells. Review of this data clearly indicates that chloroform concentrations in groundwater are widespread and appear to originate from an area southwest of Green College. The groundwater in this area is hydrologically up-gradient and/or cross-gradient to the landfill. Chloroform detection throughout the study area does not appear to originate from the landfill.

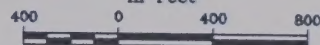
Tetrachloroethene was detected in 21 of the 25 wells and was present in all but one well where detection limits were detected. Groundwater well HL-90-2 which is cross-gradient and down-gradient to the landfill area. Tetrachloroethene is also known as perchloroethylene (PCE). Figure 2-2 is an isopleth map showing the cross gradient of tetrachloroethene in groundwater near the Wilson Landfill. Review of the sampling data from Table 2-1 and the isopleth map demonstrate that tetrachloroethene is the predominant chemical impacting groundwater in the area. Therefore, the magnitude and extent of the tetrachloroethene plume will be used throughout this assessment to represent groundwater quality near the site. This plume includes all areas where any VOCs attributable to Wilson Landfill have been detected. Although the PCE plume pictured in Figure 2-2 covers a large area (about 750 acres), concentrations of tetrachloroethene are relatively low and only slightly above the federal Maximum Contaminant Level (MCL) of 2 µg/L. The total volume of tetrachloroethene detected in a 365 acre 20-foot deep plume at concentrations represented by Figure 2-2 is approximately 7 gallons.

Tetrachloroethene is a dense non-aqueous phase liquid (DNAPL) and would sink to the bottom of an aquifer if present as a free-phase liquid. Several wells were completed in the lower portion of the aquifer and have indicated that tetrachloroethene exists as a free-phase liquid in the area. Tetrachloroethene has a solubility of 1,100 µg/L at 20 °C and would likely be detected at concentrations significantly higher than those observed if present as a phase separated liquid. This observation indicates that tetrachloroethene is likely entering the groundwater as an aqueous solution present in landfill leachate. This



Scale

In Feet



Legend

Piezometer

Monitoring Well

Irrigation Well

Domestic Well

Infiltration Gallery

Chloroform Isoconcentration Contour Line,
Maximum 1994 Detections in $\mu\text{g}/\text{L}$
Dashed where Inferred from Historic
Sampling and Groundwater Potentiometric
Surface)

General Direction of Groundwater Flow

Relative Compliance Boundary

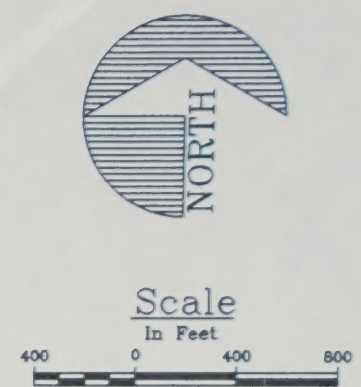
Hydrometrics, Inc.

Figure 2-1
Areal Distribution of
Chloroform in Groundwater
City of Helena Landfill
Helena, Montana

Figure 2-1 presents an isotherm map of isobutane within the area of the sample wells. Review of this clearly indicates that isobutane concentrations in groundwater are widespread and appear to originate from an area southeast of Cornell College. The groundwater in this area is hydrologically up-gradient and/or more proximal to the landfill. Chloride data used throughout the study area does not appear to originate from the landfill.

Isobutane data was detected in 71 of the 11 wells and was present in all but one well where isobutane concentrations were detected. Monitoring well MW-90-1 which is immediately adjacent and down-gradient to the landfill area. Tetrachloroethene is also shown as a hydrocarbon (HCH) in Figure 2-1 is an isotherm map showing the east disposition of tetrachloroethene in groundwater near the Illinois Landfill. Review of the mapping data from Table 2-1 and the isotherm map demonstrate that tetrachloroethene is the predominant chemical migrating groundwater in the area. Therefore, the magnitude and extent of the tetrachloroethene plume will be used throughout this document to represent groundwater quality near the site. This plume extends all areas of the site and VCE's attributable to Illinois Landfill have been detected. Although the TCE plume presented in Figure 2-1 covers a large area (365 acres), concentrations of tetrachloroethene are relatively low and only slightly above the federal Maximum Contaminant Level (MCL) of 5 ug/L. The total volume of tetrachloroethene detected in a 365 acre 50-foot deep plume at concentration represented by Figure 2-1 is approximately 7 gallons.

Tetrachloroethene is a dense non-aqueous phase liquid (DNAPL) and would tend to the bottom of an aquifer is present as a free-phase liquid. Several wells were completed in the lower reaches of the aquifer and data indicated that tetrachloroethene exists as a free phase liquid in the area. Tetrachloroethene has a solubility of 1,100 mg/L at 10 °C and would likely be detected at concentrations significantly higher than those observed if present as a phase separated liquid. This observation indicates that tetrachloroethene is likely entering the aquifer as an aqueous solution present in landfill leachate. This

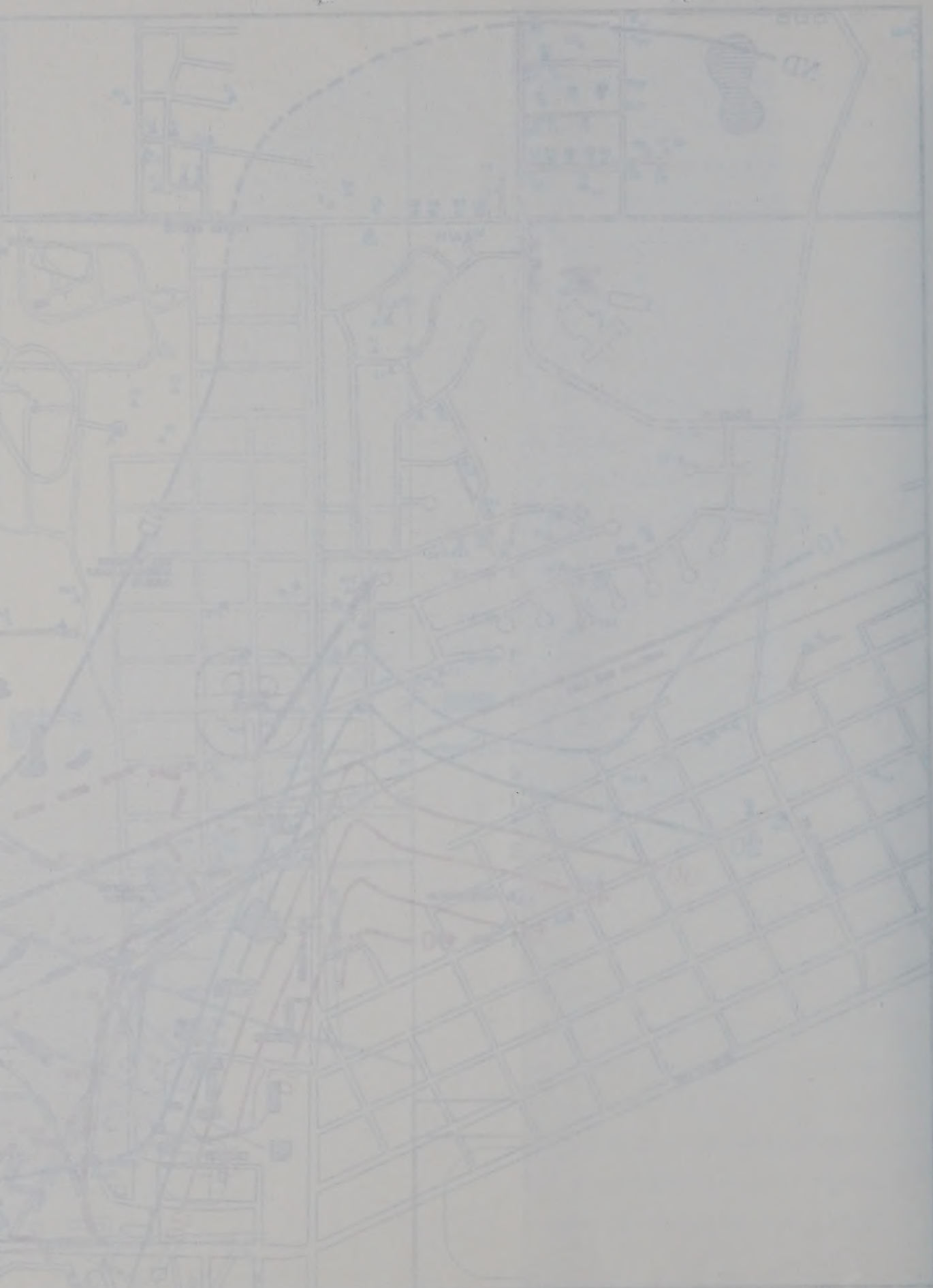


Legend

- HL-1 ■ Piezometer
- 83-6 ● Monitoring Well
- 1-6 ▲ Irrigation Well
- 80 □ Domestic Well
- ▨ Infiltration Gallery
- 20 Chloroform Isoconcentration Contour Line, Maximum 1994 Detections in µg/L (Dashed where Inferred from Historic Sampling and Groundwater Potentiometric Surface)
- ➡ General Direction of Groundwater Flow
- - - Relative Compliance Boundary

Hydrometrics, Inc.

Figure 2-1
Areal Distribution of
Chloroform in Groundwater
City of Helena Landfill
Helena, Montana

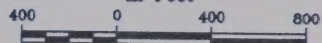


1001 W. CHURCH ST. CHICAGO, ILL. 60607
L. H. B. CO. 1001 W. CHURCH ST. CHICAGO, ILL. 60607



Scale

In Feet



Legend

Hydrometer

Monitoring Well

Investigation Well

Domestic Well

Filtration Gallery

Isoconcentration Contour Line,
Maximum 1994 Detections in $\mu\text{g/L}$
Dashed where Inferred from Historic
Sampling and Groundwater Potentiometric
Surface)

General Direction of Groundwater Flow

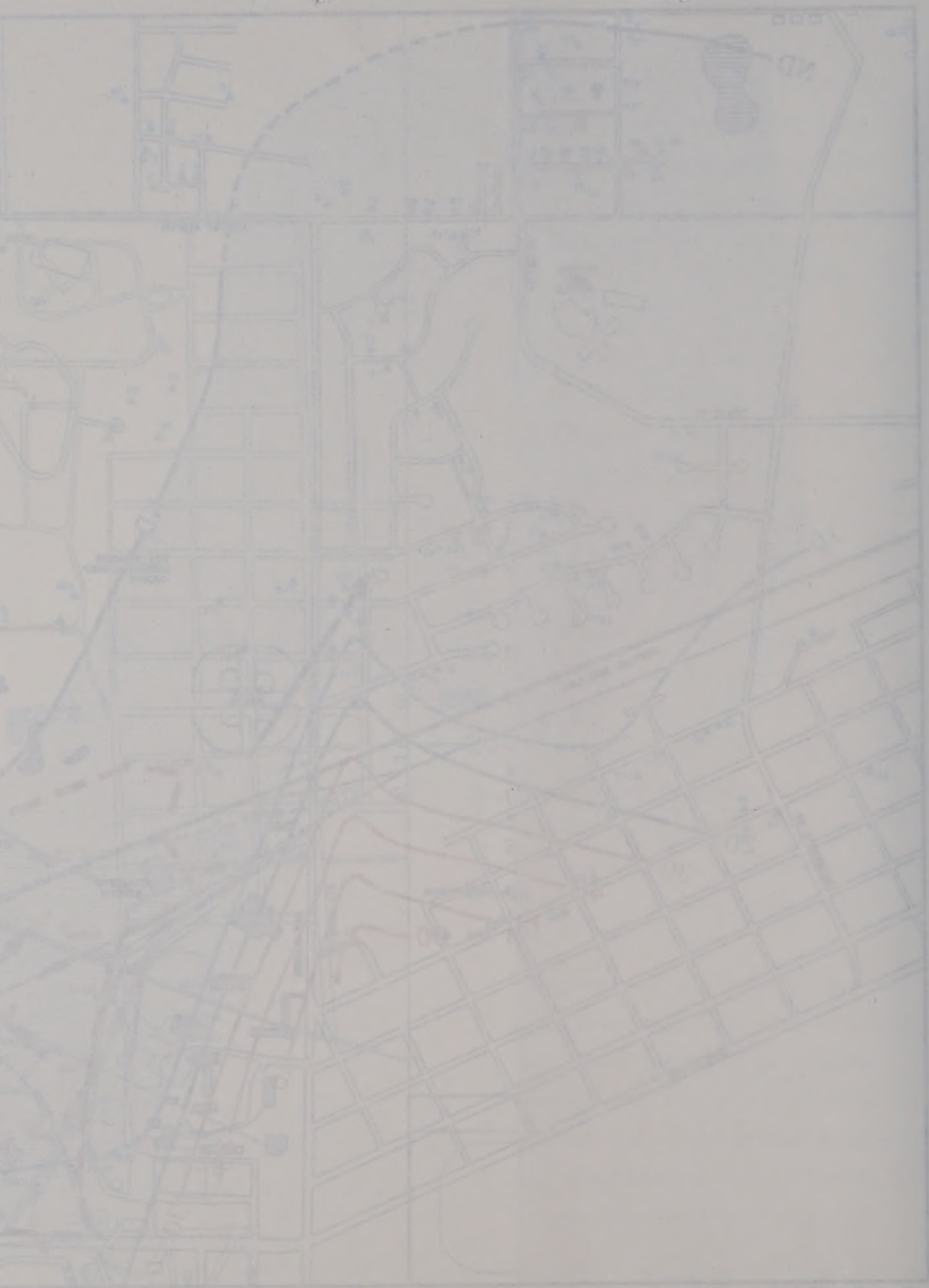
Relative Compliance Boundary

Hydrometrics, Inc.

Figure 2-2

Areal Distribution of
Chloroethene (PCE) in Groundwater

City of Helena Landfill
Helena, Montana





- Legend**
- HL-1 ■ Piezometer
 - 83-6 ● Monitoring Well
 - I-6 ▲ Irrigation Well
 - 80 □ Domestic Well
 - ▨ Infiltration Gallery
 - 5- PCE Isoconcentration Contour Line, Maximum 1994 Detections in $\mu\text{g/L}$ (Dashed where Inferred from Historic Sampling and Groundwater Potentiometric Surface)
 - ➡ General Direction of Groundwater Flow
 - - - Relative Compliance Boundary

Hydrometrics, Inc.

Figure 2-2
Areal Distribution of
Tetrachloroethene (PCE) in Groundwater
City of Helena Landfill
Helena, Montana



leachate may be caused by either condensation of landfill gases or water infiltrating through tetrachloroethene sources in the buried waste. Tetrachloroethene dissolved in groundwater is sufficiently diluted that a dissolved plume does not demonstrate the rapid sinking characteristics of free-phase tetrachloroethene.

Review of samples collected during 1994 and the direction of groundwater flow indicate another apparent source of tetrachloroethene. Tetrachloroethene was detected at 5.2 µg/L in irrigation well 28. Past sampling of irrigation well 34 also detected tetrachloroethene at 2.2 µg/L. Both these wells are cross-gradient from the landfill and are not attributable to VOC sources within the landfill. Despite originating from different source areas, impacted groundwater from both plumes converges in the area beneath the Sunhaven Subdivision. Removal of tetrachloroethene flowing from the landfill will reduce but not eliminate tetrachloroethene concentrations in this area. Consideration of existing groundwater quality should be addressed during the selection of a preferred remedy. Tetrachloroethene has been widely used in dry cleaning processes and is a common groundwater contaminant. Groundwater containing tetrachloroethene in this area may be attributable to past commercial activities in the southwest section of Helena.

All solid waste landfills generate landfill gases as organic materials are degraded biologically. The major constituents of biological landfill gas are methane, carbon dioxide, and nitrogen. Methane concentrations at the Helena Landfill are presently being monitored as a precaution for public safety. Methane is a combustible gas at specific concentrations in the presence of oxygen. Migration of methane outside of the landfill limits is a possibility due to the low gas permeability of waste materials. In addition to gases originating from degradation, VOCs present as buried waste volatilize into gases within the open spaces of the landfill. Like methane, these gases may migrate considerable distances from the buried waste. Condensation and precipitation may cause these gases to dissolve in soil moisture which eventually reaches the groundwater table. It is possible that landfill gases generated within the landfill are migrating off-site and

contaminating groundwater. Removal of VOC gases within the landfill alters the partitioning equilibrium and would limit the off-site transport of VOCs.

2.2 GROUNDWATER PROTECTION STANDARDS

The remedy selected through this corrective measures assessment must attain groundwater protection standards as established pursuant to ARM 16.14.708 (5). The groundwater protection standard for each Table 1 or Table 2 (ARM 16.14.706) constituent identified as potentially attributable to the City of Helena Landfill or migrating through the landfill is established as one of the following according to the flow chart presented in Figure 2-3:

- the maximum contaminant level (MCL) for that constituent;
- the background concentration for the constituent;
- established health-based standard for the constituent (Circular WQB-7); or
- concentration established by risk analysis performed in accordance with ARM 16.14.708 (5) (d).

Only one constituent, methylene chloride, did not have established health standards and required a risk analysis in accordance with ARM 16.14708 (5) (d). The groundwater protection standard for methylene chloride was determined by the following method:

$$C_m = [R \times W \times LT] / [CSF \times I \times A \times ED]$$

where:

C_m = Concentration in water (mg/L)

R = Assumed risk level (1×10^{-6})

W = Body weight (70 kg for an adult)

LT = Lifetime (70 years)

CSF = Carcinogenic slope factor ($7.5 \times 10^{-3}/(\text{mg/kg/day})$)

(Obtained from EPA, 1991)

I = Intake rate (2 liters/day)

A = Adsorption factor (1, i.e., 100% adsorption)

ED = Exposure duration (70 years)

containing... of VOC... within the...
... of VOC...

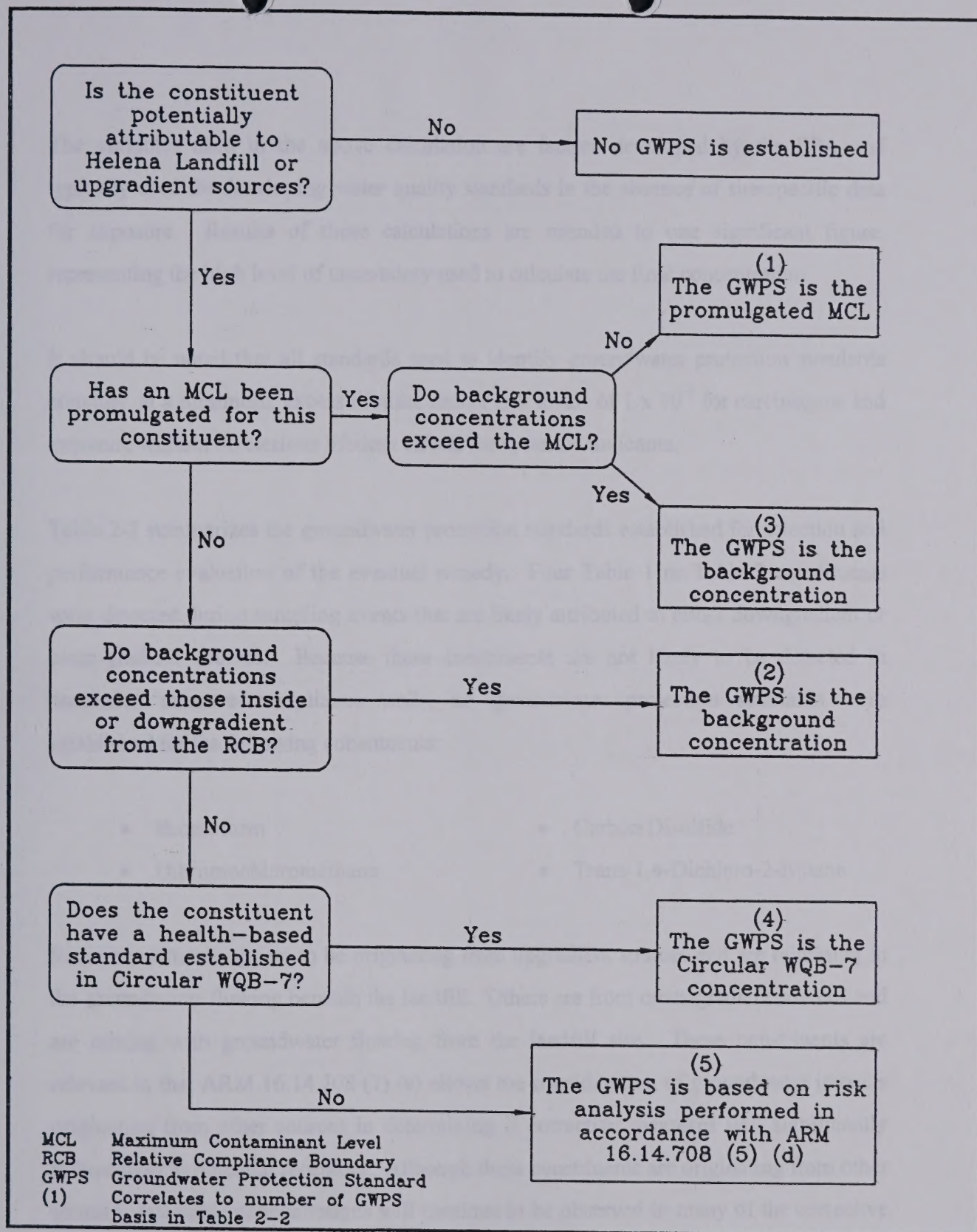
1.1. GENERAL TEST PROTOCOL

The... through the...
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• the...
• the...
• the...
• the...
- ...
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2.1. W. L. T. (W. L. T.)

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Proj. No: CHHL03
 Dwg. No: 52895012
 Drawn By: 0089
 Last Update: 2/3/95 0083
 Ref. Dwg:
 Rev. Date:

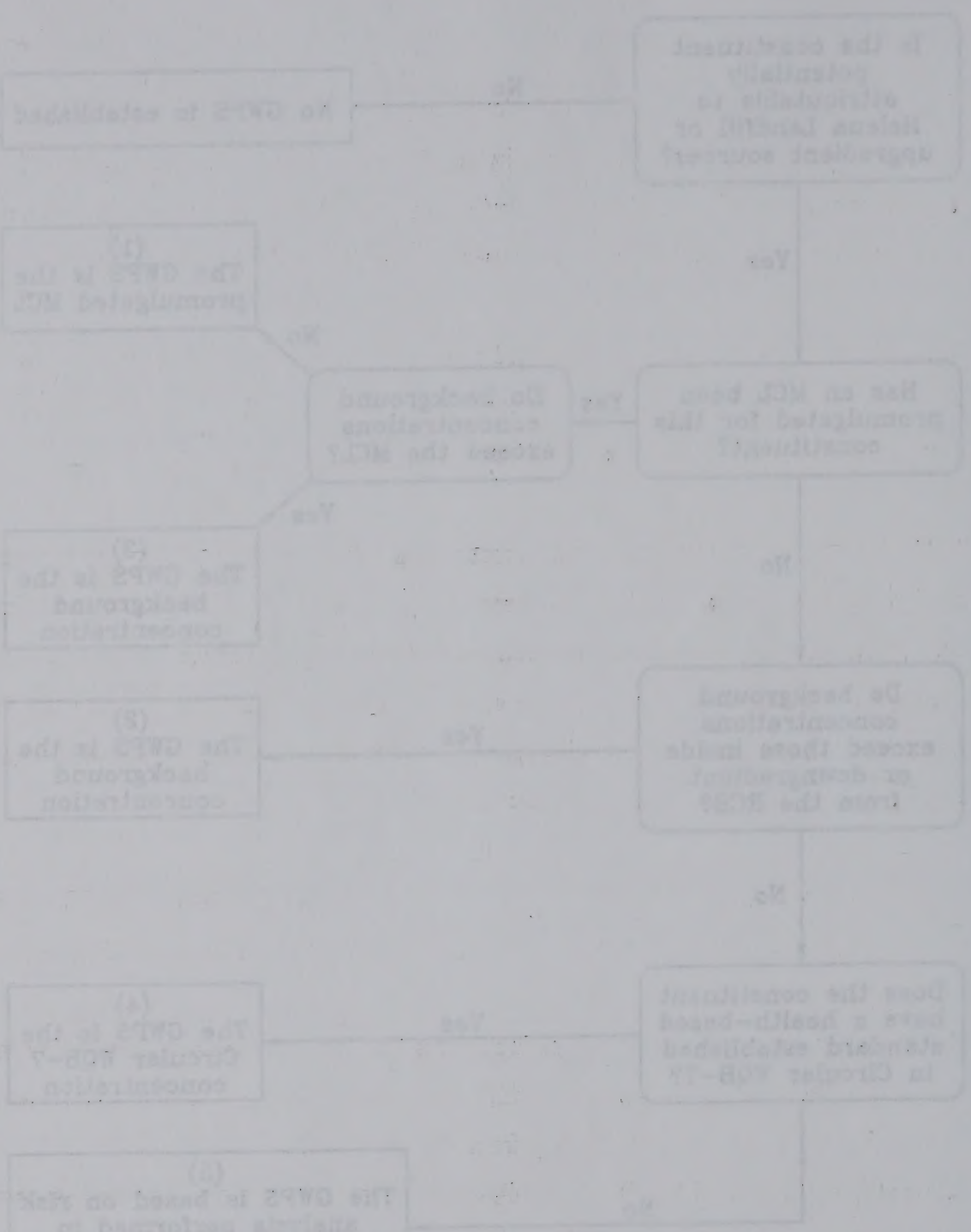
Hydrometrics, Inc.

Figure 2-3
 Groundwater Protection
 Standard Flow Chart

City of Helena Landfill
 Helena, Montana

Rev. No. 001-02
Date: 10/20/02
Drawn By: JMM
Last Update: 10/20/02
Rev. Date:
Rev. Date:

- (1) Consistent in quantity at GWS?
- (2) Consistent in quality at GWS?
- (3) Consistent in location?
- (4) Consistent in depth?
- (5) Consistent in width?



The variables used in the above calculation are factors developed by the EPA and typically used for developing water quality standards in the absence of site-specific data for exposure. Results of these calculations are rounded to one significant figure, representing the high level of uncertainty used to calculate the final concentration.

It should be noted that all standards used to identify groundwater protection standards consider, at a minimum, excess lifetime cancer risk levels of 1×10^{-4} for carcinogens and exposure without deleterious lifetime effects for systemic toxicants.

Table 2-2 summarizes the groundwater protection standards established for selection and performance evaluation of the eventual remedy. Four Table 1 or Table 2 constituents were detected during sampling events that are likely attributed to either downgradient or cross-gradient sources. Because these constituents are not likely to be detected in corrective measure compliance wells, no groundwater protection standards were established for the following constituents:

- Bromoform
- Carbon Disulfide
- Dibromochloromethane
- Trans-1,4-Dichloro-2-Butene

Some constituents appear to be originating from upgradient sources and are migrating in the groundwater flowing beneath the landfill. Others are from cross-gradient sources and are mixing with groundwater flowing from the landfill site. These constituents are relevant in that ARM 16.14.708 (7) (e) allows the consideration of groundwater impacts originating from other sources in determining if corrective measures will significantly reduce risks to potential receptors. Although these constituents are originating from other sources, detectable concentrations will continue to be observed in many of the corrective measure compliance wells or downgradient irrigation wells. Therefore, groundwater

The results used in the above calculations are factors developed by the EPA and
specifically used for developing water quality standards in the absence of site-specific data.
The exposure factors of these calculations are intended to be significant figures
representing the high level of uncertainty used to calculate the final concentration.

It should be noted that all standards used to identify groundwater protection standards
are based on a maximum average lifetime cancer risk level of 1×10^{-6} for carcinogens and
exposure without additional lifetime effects for systemic toxicants.

Table 2-2 summarizes the groundwater protection standards established for selection and
performance evaluation of the various remedy. From Table 1 or Table 2, concentrations
were selected during sampling events that are likely to occur to other locations or
contaminant sources. Because these concentrations are not likely to be detected in
corrective remedy monitoring wells, no groundwater protection standards were
established in the following calculations.

Remedy
Table 2-3, Table 2-4, Table 2-5, Table 2-6

These standards appear to be significant for significant sources and are in Table 2-3
the groundwater protection standards for the landfill. Other are from groundwater sources and
are in Table 2-4, Table 2-5, Table 2-6, Table 2-7. These concentrations are
related to the ARAR 10-14-105 (7) (c) which the consideration of groundwater impacts
relating to other sources is determined. If corrective measures will significantly
reduce this potential exposure. Although these concentrations are significant from other
sources, data this concentration will continue to be observed in many of the corrective
remedy monitoring wells at the landfill. Therefore, groundwater

TABLE 2-2
Development of Groundwater Protection Standards

Parameter	Max. Detect. Upgradient (mg/L)	Max. Detect. Inside RCB (mg/L)	Max. Detect. Downgradient (mg/L)	Potentially Attributed to Helena Landfill?	Develop GW Protection Standard?	Contaminant of Concern?	GW Protection Standard (mg/L)	GW Protection Standard Basis
Arsenic	0.0070	nd	nd	no	✓*	no	0.05	(1)
Barium	nd	0.1000	0.1000	✓	✓	no	2.0	(1)
Iron	0.0900	0.0300	nd	✓	✓	no	300	(4)
Selenium	0.0270	nd	nd	no	✓*	no	0.05	(1)
Zinc	0.0300	0.1500	0.0700	✓	✓	no	5.0	(4)
1,1,1-Trichloroethane	nd	0.0041	0.0017	✓	✓	no	0.2	(1)
1,1-Dichloroethane	nd	0.0073	0.0010	✓	✓	no	0.007	(1)
1,2-Dichloropropane	nd	0.0028	nd	✓	✓	no	0.005	(1)
Bromodichloromethane	0.0170	nd	0.0015	no	✓*	no	0.017	(2)
Bromoform	0.0150	nd	nd	no	-	-	-	-
Carbon Disulfide	nd	nd	0.0021	no	-	-	-	-
Chloroform	0.0620	0.0061	0.0430	no	✓*	no	0.062	(2)
Cis-1,2-Dichloroethene	nd	0.0018	0.0024	✓	✓	no	0.07	(1)
Dibromochloromethane	0.0290	nd	nd	no	-	-	-	-
Dichlorodifluoromethane	nd	0.0044	0.0030	✓	✓	no	6.9	(4)
Methylene Chloride	nd	0.0021	0.0012	✓	✓	no	0.005	(5)
Tetrachloroethene	0.0052	0.0410	0.0051	✓	✓	✓	0.005	(1)
Toluene	nd	nd	0.0062	✓	✓	no	1.0	(1)
Trichloroethene	nd	0.0031	nd	✓	✓	no	0.005	(1)
Trichlorofluoromethane	nd	0.0030	0.0015	✓	✓	no	10.0	(4)
Trans-1,4-Dichloro-2-Butene	nd	nd	0.0020	no	-	-	-	-
Bis (2-ethylhexyl) Phthalate	0.0100	nd	nd	no	✓*	no	0.01	(3)
Cyanide (total)	nd	0.0400	0.0047	✓	✓	no	0.2	(4)
Sulfide	0.0400	0.0400	nd	✓	no**	-	-	-

Concentrations in **bold** equal or exceed the Groundwater Protection Standard

- (1) Maximum Contaminant Level (MCL) as adopted by the State of Montana
- (2) Based on highest value measured in background wells
- (3) Background concentration exceeds MCL or health-based standard
- (4) Health-based standard (from Circular WQB-7)
- (5) Based on risk analysis performed in accordance with ARM 16.14.708 (5) (d)

RCB Relative Compliance Boundary

nd Not Detected

- Parameter has been eliminated - no Groundwater Protection Standard is established

✓* Groundwater Protection Standard necessary despite upgradient source

no** No existing guidance or standards for protection of human health

Shading indicates a Contaminant of Concern

TABLE 2-4
 Comparison of Groundwater Protection Programs

Program	Cost (\$/yr)	Flow (MGD)	Flow (MGD)	Flow (MGD)	Flow (MGD)	Flow (MGD)	Flow (MGD)	Flow (MGD)
1	100	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2	200	2.0	2.0	2.0	2.0	2.0	2.0	2.0
3	300	3.0	3.0	3.0	3.0	3.0	3.0	3.0
4	400	4.0	4.0	4.0	4.0	4.0	4.0	4.0
5	500	5.0	5.0	5.0	5.0	5.0	5.0	5.0
6	600	6.0	6.0	6.0	6.0	6.0	6.0	6.0
7	700	7.0	7.0	7.0	7.0	7.0	7.0	7.0
8	800	8.0	8.0	8.0	8.0	8.0	8.0	8.0
9	900	9.0	9.0	9.0	9.0	9.0	9.0	9.0
10	1000	10.0	10.0	10.0	10.0	10.0	10.0	10.0
11	1100	11.0	11.0	11.0	11.0	11.0	11.0	11.0
12	1200	12.0	12.0	12.0	12.0	12.0	12.0	12.0
13	1300	13.0	13.0	13.0	13.0	13.0	13.0	13.0
14	1400	14.0	14.0	14.0	14.0	14.0	14.0	14.0
15	1500	15.0	15.0	15.0	15.0	15.0	15.0	15.0
16	1600	16.0	16.0	16.0	16.0	16.0	16.0	16.0
17	1700	17.0	17.0	17.0	17.0	17.0	17.0	17.0
18	1800	18.0	18.0	18.0	18.0	18.0	18.0	18.0
19	1900	19.0	19.0	19.0	19.0	19.0	19.0	19.0
20	2000	20.0	20.0	20.0	20.0	20.0	20.0	20.0
21	2100	21.0	21.0	21.0	21.0	21.0	21.0	21.0
22	2200	22.0	22.0	22.0	22.0	22.0	22.0	22.0
23	2300	23.0	23.0	23.0	23.0	23.0	23.0	23.0
24	2400	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25	2500	25.0	25.0	25.0	25.0	25.0	25.0	25.0
26	2600	26.0	26.0	26.0	26.0	26.0	26.0	26.0
27	2700	27.0	27.0	27.0	27.0	27.0	27.0	27.0
28	2800	28.0	28.0	28.0	28.0	28.0	28.0	28.0
29	2900	29.0	29.0	29.0	29.0	29.0	29.0	29.0
30	3000	30.0	30.0	30.0	30.0	30.0	30.0	30.0

The numbers in bold indicate the groundwater protection program.

- 1. Groundwater protection (GWP) is required by the state.
- 2. Groundwater protection (GWP) is required by the state.
- 3. Groundwater protection (GWP) is required by the state.
- 4. Groundwater protection (GWP) is required by the state.
- 5. Groundwater protection (GWP) is required by the state.
- 6. Groundwater protection (GWP) is required by the state.
- 7. Groundwater protection (GWP) is required by the state.
- 8. Groundwater protection (GWP) is required by the state.
- 9. Groundwater protection (GWP) is required by the state.
- 10. Groundwater protection (GWP) is required by the state.
- 11. Groundwater protection (GWP) is required by the state.
- 12. Groundwater protection (GWP) is required by the state.
- 13. Groundwater protection (GWP) is required by the state.
- 14. Groundwater protection (GWP) is required by the state.
- 15. Groundwater protection (GWP) is required by the state.
- 16. Groundwater protection (GWP) is required by the state.
- 17. Groundwater protection (GWP) is required by the state.
- 18. Groundwater protection (GWP) is required by the state.
- 19. Groundwater protection (GWP) is required by the state.
- 20. Groundwater protection (GWP) is required by the state.
- 21. Groundwater protection (GWP) is required by the state.
- 22. Groundwater protection (GWP) is required by the state.
- 23. Groundwater protection (GWP) is required by the state.
- 24. Groundwater protection (GWP) is required by the state.
- 25. Groundwater protection (GWP) is required by the state.
- 26. Groundwater protection (GWP) is required by the state.
- 27. Groundwater protection (GWP) is required by the state.
- 28. Groundwater protection (GWP) is required by the state.
- 29. Groundwater protection (GWP) is required by the state.
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Groundwater protection (GWP) is required by the state.

protection standards have been established for the following constituents to verify that detected concentrations remain attributable to up-gradient sources:

- Arsenic
- Bromodichloromethane
- Chloroform
- Bis (2-ethylhexyl) Phthalate
- Selenium

Sulfide was detected at MPC-1, but at concentrations considerably lower than the practical quantitation limit listed in ARM 16.19.706. No guidance or standards have been established for protection of human health for sulfide, and therefore, no groundwater protection standards has been established:

The remaining constituents were detected during sampling and are potentially attributable to the landfill. Therefore, groundwater protection standards were established for the following (Table 2-2):

- Barium
- Cyanide
- Dichlorodifluoromethane
- 1,1-Dichloroethane
- Cis-1,2-Dichloroethene
- 1,2-Dichloropropane
- Iron
- Methylene Chloride
- Toluene
- 1,1,1-Trichloroethane
- Trichloroethene
- Trichlorofluoromethane
- Zinc

2.3 CONTAMINANTS OF CONCERN

Previous sections have detailed the detection of several organic and inorganic constituents in monitoring wells in and near the Helena Landfill. In order for a chemical constituent to be considered a Contaminant of Concern for corrective measures consideration, it must meet the following criteria:

- the constituent must be detected in downgradient wells at a statistically significant concentration over levels found in upgradient wells, and
- the constituent must be present at the relative point of compliance at a concentration above the Ground Water Protection Standard (GWPS) as defined in ARM 16.14.708 (5).

In summary, a detected constituent is only a Contaminant of Concern when it is attributable to the landfill and detected at or outside the relative compliance boundary at concentrations exceeding the groundwater protection standard. Table 2-2 presents an initial screening of detected constituents for classification as Contaminants of Concern based on the criteria listed above.

Tetrachloroethene is the only Contaminant of Concern for the Helena Landfill CMA. The corrective measures evaluated in this CMA will be specifically designed to address tetrachloroethene.

2.4 CONTAMINANT FATE AND TRANSPORT

This section identifies the physical and chemical properties of tetrachloroethene, and evaluates the mechanisms controlling its environmental fate and transport. The information presented is largely summarized from the Health Effects Assessment Document for Tetrachloroethene (EPA, 1985).

Tetrachloroethene is a colorless, heavy liquid. It has a chloroform-like odor which can be smelled at concentrations in water greater than 300 ug/l. Principle commercial uses include dry cleaning solvent, dried vegetable fumigant, rug and upholstery cleaner, lipstick remover, paint remover, and metal degreaser.

the constituent must be detected in the groundwater wells in a statistically significant concentration over levels found in adjacent wells, and

the constituent must be present at the relative level of response to a concentration above the Ground Water Protection Standard (GWPS) as defined in ARM 16.4.702 (2).

In summary, a detected constituent is only a Constituent of Concern when it is attributable to the landfill and detected at or exceeds the relative response boundary as determined by the groundwater protection standard. Table 2-2 presents an initial screening of detected constituents for classification as Constituents of Concern based on the criteria listed above.

Perchloroethylene is the only Constituent of Concern for the Wilson Landfill CMA. The constituent measures evaluated in the CMA will be periodically designed to address perchloroethylene.

2.4 CONTAMINANT FATE AND TRANSPORT

This section describes the physical and chemical properties of perchloroethylene, and evaluates the mechanisms controlling its environmental fate and transport. The information presented is largely summarized from the Health Effects Assessment Document for Perchloroethylene (EPA 1989).

Perchloroethylene is a colorless, heavy liquid that has a chlorine-like odor which can be smelled at concentrations as low as 100 ppb. Physical and chemical properties include its cleaning solvent, high volatility, high boiling point, and high density. It is not biodegradable and is not flammable.

Tetrachloroethene has physical properties which make it:

- **Relatively insoluble in water**, with a solubility of 150 mg/L;
- **Lipophilic**, with a octanol/water partition coefficient of 399 to 871;
- **More dense than water**, with a specific gravity of 1.624 at 20°C;
- **Volatile in air**, with a vapor pressure of 19 torr at 25 °C;
- **Relatively stable**, with limited photochemical and aqueous decomposition.

These properties provide for a general understanding of potential fate and transport of tetrachloroethene in the environment.

Groundwater Transport. Once released into groundwater, tetrachloroethene would be expected to only partially dissolve into water. A much larger portion of the chemicals would adsorb to soils, provided the soils contained significant amounts of organic material. As a result of soil adsorption, the rate at which tetrachloroethene is transported in groundwater would be retarded from the total groundwater flow rate.

In a pure water system, the density of tetrachloroethene would cause the chemical to sink below the water. However, this behavior can be influenced by the presence of other organics on the surface of the water, or the presence of organic rich soils. Because tetrachloroethene is lipophilic (dissolves into organics more readily than water), it will concentrate in other organic rich media.

Degradation in Water. While relatively stable in water, tetrachloroethene will degrade. The rate of tetrachloroethene degradation is greater when exposed to daylight. Degradation products likely include trichloroacetic acid, hydrochloric acid, and various smaller chlorinated organics (trichloroethylene, dichloroethylene, chloroethene, and methylene chloride).

Transmembrane protein complex which is

- Relatively insoluble in water, with a solubility of 1.10 mg/L
- Lipophilic with a partition coefficient of 100 to 1000
- More dense than water with a specific gravity of 1.02 at 20°C
- Volatile in air, with a vapor pressure of 15 mm at 25°C
- Relatively stable, with limited photochemical and aqueous decomposition

These properties provide for a general understanding of potential fate and transport of this compound in the environment.

Environmental Transport: Once released into groundwater, insecticides would be expected to only partially dissolve into water. A much larger portion of the insecticide would remain in soil, provided the soil contained significant amounts of organic material. As a result of soil adsorption, the rate at which insecticides are transported in ground water would be retarded from the total groundwater flow rate.

In a free water system, the degree of insecticide transport would depend on the chemical's solubility in water. However, this behavior can be influenced by the presence of other organic or inorganic substances in the water or the presence of organic rich soils. Because insecticide is lipophilic (dissolves in organic matter readily than water), it will adsorb onto organic matter in the soil.

Biodegradation in Water: While insecticides are in water, biodegradation will be rapid. The rate of biodegradation is greater when exposed to daylight. Biodegradation products likely include hydroxy acids, hydroxy acids, and other smaller chemical species. (Chlorinated, chlorinated, chlorinated, and chlorinated species)

Volatilization. Once exposed to surface water, tetrachloroethene would be expected to volatilize into the air rapidly (half-life of less than 1 to 20 days). However, much longer half-lives of nearly one year have been observed in some natural environments. These longer than expected half-lives may be due to the presence of organics in the water, which would act to absorb tetrachloroethene and reduce volatilization.

Bioconcentration/Bioaccumulation. Upon exposure to biota, the lipophilic behavior of tetrachloroethene indicates it would be readily adsorbed. However, upon absorption tetrachloroethene is rapidly excreted and therefore does not exhibit large bioconcentration or bioaccumulation potential.

2.5 RISK TO HUMAN HEALTH AND THE ENVIRONMENT

For a toxic effect to occur, exposure to the chemical must occur, and the chemical must have toxic properties. This section identifies possible routes by which humans or biota may be exposed to tetrachloroethene, and evaluates risk based on the chemical's toxicity. As for the previous section, the information presented is largely summarized from the Health Effects Assessment Document for Tetrachloroethene (EPA, 1985). Regulatory standards were obtained from IRIS (EPA, 1994).

2.5.1 Existing and Future Potential Routes of Exposure

There are no mechanisms of exposure to tetrachloroethene in groundwater, and the groundwater does not surface on its own (in the form of seeps or surface ponds) in areas nearby the landfill. Therefore, exposure is limited to cases where groundwater containing tetrachloroethene is pumped via wells to the surface. Zoning restrictions for the city of Helena limit the use of groundwater northwest of the landfill (where tetrachloroethene may potentially exist at a concentration above the MCL) to watering and irrigation use only.

Under existing water use conditions, the following routes of exposure to humans and biota in this area, could possibly occur:

Volatilization. Once exposed to surface water, trichloroethylene would be expected to volatilize into the air rapidly (half-life of less than 1 to 20 days). However, much longer half-lives of many years have been observed in some natural environments. These longer than expected half-lives may be due to the presence of organics in the water, which would act to absorb trichloroethylene and reduce volatilization.

Bioaccumulation/Bioconcentration. Upon exposure to biota, the biogeochemical behavior of trichloroethylene indicates it would be readily absorbed. However, upon absorption trichloroethylene is rapidly excreted and therefore does not exhibit large bioconcentration or bioaccumulation potential.

2.2. RISK TO HUMAN HEALTH AND THE ENVIRONMENT

For a toxic effect to occur, exposure to the chemical must occur, and the chemical must have toxic properties. This section identifies possible routes by which humans or biota may be exposed to trichloroethylene and evaluates risk based on the chemical's toxicity. As for the review section, the information presented is largely summarized from the Health Effects Assessment Document for Trichloroethylene (EPA, 1982). Routes of exposure were identified from IRIS (EPA, 1994).

2.2.1. Existing and Potential Routes of Exposure

There are no mechanisms of exposure to trichloroethylene in groundwater, and the groundwater does not surface on its own (in the form of seeps or surface ponds) in areas nearby the landfill. Therefore, exposure is limited to areas where groundwater containing trichloroethylene is pumped via wells to the surface. Existing institutions for the city of Boston limit the use of groundwater north of the landfill (where trichloroethylene may potentially exist at a concentration above the MCL) to drinking and irrigation use only.

Under existing water use conditions, the following routes of exposure to humans and biota in this area could possibly occur:

- absorption of the chemical upon direct contact with skin;
- inhalation of the chemical upon volatilization in air;
- incidental ingestion of aspirated water droplets or water droplets on hands, etc.; and
- ingestion of the chemical which may absorb into home grown produce.

The nature of these types of exposures are such that exposures would occur intermittently, and the duration of exposure by an individual to the chemical would be limited. These short-term and intermittent exposures act to reduce the potential for risks.

In the event that zoning restrictions on groundwater use change to allow drinking water use, future potential exposure to humans could also include drinking water and showering (a combination of inhalation and dermal contact). These future potential exposure routes, particularly drinking water exposures, would result in much greater exposures than occur presently.

2.5.2 Chemical Toxicity and Relevant Water Quality Standards

Exposure to high concentrations of tetrachloroethene is known to cause a variety of toxicological effects in humans, including effects on the central nervous system, liver and kidney. Central nervous system effects have been observed in controlled human studies with short term exposures exceeding 100 ppm (678 mg/m³). These levels are much greater than could be derived from groundwater downgradient of the Helena Landfill. Human evidence of adverse effects to the liver and kidneys are based on accidental occupational exposures at concentrations much greater than 100 ppm. Studies based on experimental animals suggest that reversible changes to liver and kidneys may occur in humans at inhalation concentrations of 200 ppm. No studies were identified in this literature review of tetrachloroethylene exposure to humans via ingestion in food or water.

EPA Drinking Water Health Advisories. The EPA Office of Drinking Water has established Drinking Water Health Advisories for toxic chemicals as technical guidance for the protection of public health. Based on a study in which mice were exposed to tetrachloroethene via gavage (introducing the material into the stomach using a tube), long-term health advisories for protection against non-carcinogenic effects have been determined at:

- 1.4 mg/l for children; and
- 5 mg/l for adults

The advisories are calculated from the no observed adverse effect level (NOAEL) obtained from the experiment, default drinking water consumption rates (1 liter per day for children and 2 liters per day for adults), and an uncertainty factor of 100 (to account for interspecies and intrahuman variability with the use of a NOAEL derived from an animal study). Since these values are based on non-carcinogenic endpoints, the use of these values are prefaced by a pending final determination by the EPA on the carcinogenic potential of tetrachloroethene.

EPA Maximum Contaminant Levels. Additionally, the EPA has established Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act. MCLs are enforceable federal standards applied to public drinking water supply systems. They are based on the chemical toxicity and the technological and economic feasibility of achieving the standard. The MCL for tetrachloroethene is 0.005 mg/l. The value is established assuming tetrachloroethene is carcinogenic, with the standard set at the practical quantitation limit (PQL). The PQL is the lowest concentration which can be reliably detected using routine analytical procedures.

Calculated Carcinogenic Risks. The EPA has tentatively classified tetrachloroethene as a probable (group B2) carcinogen, meaning the toxicity factor used to calculate risk is based on sufficient evidence of carcinogenicity in animals with inadequate or lack of

EPA Drinking Water Health Advisories. The EPA Office of Drinking Water has established Drinking Water Health Advisories for toxic chemicals as technical guidance for the protection of public health. Based on a study in which rats were exposed to the chemical via gavage (introducing the chemical into the stomach using a tube), long-term health advisories for protection against non-carcinogenic effects have been determined as:

- 1.4 mg/L for children and
- 2 mg/L for adults

The advisories are calculated from the observed adverse effect level (OHAEL) obtained from the experiment, default drinking water consumption rate (1 liter per day for children and 2 liters per day for adults), and an uncertainty factor of 100 (to account for interspecies and intraspecies variability with the use of a NOAEL derived from an animal study). Since these values are based on non-carcinogenic endpoints, the use of these values are protected by a default risk determination by the EPA on the carcinogenic potential of carcinogens.

EPA Maximum Contaminant Levels. Additionally, the EPA has established Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act. MCLs are enforceable federal standards applied to public drinking water supply systems. They are based on the chemical toxicity and the technological and economic feasibility of achieving the standard. The MCL for benzothiazole is 0.005 mg/L. The value is established assuming benzothiazole is carcinogenic with the standard set at the predicted maximum level (PML). The PML is the lowest concentration which can be reliably detected using routine analytical procedures.

Calculated Carcinogenic Risk. The EPA has tentatively classified benzothiazole as a probable (Group B2) carcinogen, meaning the toxicity factor used to calculate risk is based on sufficient evidence of carcinogenicity in animals with evidence or lack of

evidence in humans. Of the available studies conducted to date, the EPA oral toxicity factor is based on the study with the most statistically significant increase in cancers. The study identified liver cancers in mice exposed via gavage. Based on this study a toxicity factor of 5.1/(mg/kg/day) was established (EPA, 1991). Applying this toxicity factor and assuming a 70 kg adult is exposed to 2 liters of water per day for a lifetime, the following risks are calculated:

<u>Exposed Concentration</u>	<u>Associated Level of Risk</u>
• 0.07 mg/l	One in 10,000 (or 10^{-4})
• 0.007 mg/l	One in 100,000 (or 10^{-5})
• 0.0007 mg/l	One in 1,000,000 (or 10^{-6})

As for all cancer risk estimates based on EPA established toxicity factors, these risks are estimated upper confidence limits of risk. The actual risks may be lower, and may be as low as zero. This is particularly relevant to the evaluation of tetrachloroethene, since a final determination by the EPA regarding the carcinogenic potential is pending. While a carcinogenic toxicity factor is published in Health Effects Assessment Summary Tables (HEAST - EPA, 1991), no carcinogenic toxicity factor is published in Integrated Risk Information System (IRIS - EPA, 1994) pending a final determination. IRIS is EPA's primary source of information on toxicity factors, while HEAST is a secondary reference. The discrepancy between IRIS and HEAST exists because the EPA has not made a final decision on whether tetrachloroethene should be classified as a probable human carcinogen (group B2) or as a possible human carcinogen (group C). If the EPA decides on a Group C classification, the Health Advisories provided above would serve as the basis for regulatory standards. If EPA decides on a Group B2 classification, the present MCL would likely continue to serve as the principle regulatory water quality standard.

With uncertainties regarding the actual carcinogenic potential of tetrachloroethene in mind, the present MCL for tetrachloroethene of 0.005 mg/L is expected to be protective of approximately a one-in-100,000 risk (or 10^{-5}) of contacting cancer. Estimation of risks

reference is made to the available data conducted to date the EPA will conduct further studies on the basis of the data with the most statistically significant difference in response. The study identified four classes in which exposed via dermal. Based on this study, a toxicity factor of 0.1 (mg/kg/day) was established (EPA, 1991). Applying this toxicity factor and assuming a 70 kg adult is exposed to 1 liter of water per day for a lifetime, the following table was developed:

Estimated Concentration	Assumed Daily Intake
0.07 mg/l	One in 10,000 (or 10 ⁻⁵)
0.007 mg/l	One in 100,000 (or 10 ⁻⁶)
0.0007 mg/l	One in 1,000,000 (or 10 ⁻⁷)

As for all other risk estimates based on EPA established toxicity factors, these risks are estimated upon confidence limits of risk. The actual risk may be lower, and may be as low as zero. This is particularly relevant to the evaluation of non-carcinogenic risks. Risk determination by the EPA regarding the carcinogenic potential is pending. While a carcinogenic hazard factor is provided in Health Effects Assessment Summary Tables (HEAST - EPA, 1991), no carcinogenic hazard factor is provided in the Agency's Risk Assessment System (EPA, 1991) regarding a final determination. This is EPA's primary source of information regarding hazard, while the Agency's Risk Assessment System is the primary source of information regarding exposure. The discrepancy between the HEAST and the Risk Assessment System is because the EPA has not made a final decision on whether non-carcinogenic risks should be classified as a possible human carcinogen (Group II) or as a possible human carcinogen (Group I). If the EPA decides on a Group I classification, the Health Assessment System's hazard factor would apply to the risk for regulatory analysis. If EPA decides on a Group II classification, the hazard factor would only be used to estimate the potential for carcinogenicity. While the Agency's Risk Assessment System is the primary source of information regarding exposure, the actual carcinogenic potential of non-carcinogens is not known. The Agency's Risk Assessment System is based on the assumption that the potential for carcinogenicity is the same as the potential for non-carcinogenicity. This is a conservative assumption, and the Agency's Risk Assessment System is designed to be protective of public health.

With information regarding the actual carcinogenic potential of non-carcinogens in mind, the Agency's Risk Assessment System is based on the assumption that the potential for carcinogenicity is the same as the potential for non-carcinogenicity. This is a conservative assumption, and the Agency's Risk Assessment System is designed to be protective of public health.

for other exposure pathways other than through drinking water are beyond the intended scope of this evaluation, but are expected to be one or more orders of magnitude less than for drinking water.

Risks to Environmental Receptors

Environmental receptors in the Helena area might include rodents, pets, and birds. These receptors could potentially be exposed to pooled surface water derived from irrigation water uses. These exposures would likely occur intermittently in a dry climate such as Helena's, where water seeps into the ground rapidly. In addition, the tetrachloroethene in the irrigation water would be expected to volatilize out of the irrigation water very rapidly.

A review of experimental results provided in the Health Assessment Document for Tetrachloroethene (EPA, 1985) indicates that 50 percent of exposed mice could die upon ingestion of approximately 8,000 mg of tetrachloroethene per kg body weight. For dogs, cats and rabbits, no deaths were observed with exposures of 4,000 to 5,000 mg of tetrachloroethene (depending on the species) per kilogram body weight. An Eastern Cottontail rabbit weighs approximately 1 kilogram, and could therefore consume 5,000 mg of tetrachloroethene (the experimental result for a rabbit) without receiving a lethal dose. At the maximum concentration observed in any well during 1994 of 0.04 mg/l, a receptor (such as a rabbit) would need to consume 125,000 liters of water during a short-term exposure period to ingest 5,000 mg of tetrachloroethene.

This amount of ingestion is entirely impossible, indicating minimal to no risk to mammalian environmental receptors. No experimental results specific to birds was found in our literature search.

The other exposure pathways other than through drinking water are beyond the intended scope of this evaluation, but are expected to be one or more orders of magnitude less than the drinking water.

Risks to Environmental Receptors

Environmental receptors in the Helicon area include wildlife, birds, and plants. These receptors could potentially be exposed to ground surface water derived from infiltration of water from the Helicon area. These exposures would likely occur intermittently in a dry climate such as Helicon's where water seeps into the ground rapidly. In addition, the receptors in the Helicon area would be exposed to water from the infiltration of water from the Helicon area.

A review of experimental results provided in the Health Assessment Document for Toxic Substances (EPA, 1985) indicates that 50 percent of exposed mice could die upon ingestion of approximately 2,000 mg of hexachlorobenzene per kg body weight. For dogs, rats and rabbits, no deaths were observed with exposures of 4,000 to 2,000 mg of hexachlorobenzene (depending on the species) per kilogram body weight. An Eastern Gull chick which weighed approximately 1 kilogram and could tolerate a dose of 4,000 mg of hexachlorobenzene (the experimental result for a single bird) without exhibiting a fatal dose. At the ingestion concentration observed in my well during 1984 of 0.05 mg/L, a receptor (such as a rabbit) would need to ingest 120,000 mg of water during a short-term exposure period to ingest 2,000 mg of hexachlorobenzene.

The extent of ingestion is entirely hypothetical, but being minimal to not risk to terrestrial environmental receptors. The exposure to receptors is being evaluated in our future study.

3.0 CORRECTIVE ACTION OBJECTIVES

This section begins the process of developing and evaluating corrective measure alternatives for remediation of groundwater at the City of Helena Landfill by establishing the objectives which the selected remedy will be expected to achieve. These objectives are specified in ARM 16.14.708 (7) (b) and include the following:

- Protection of Human Health and the Environment
- Attainment of Groundwater Protection Standards
- Control of Source Area
- Compliance with Waste Management Practices
- Approval by MDHES

The following sections detail each of the four objectives and the subsequent screening methodology used in this CMA.

3.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This objective requires the selected remedy to be protective of human health and the environment. A remedy is protective if it adequately eliminates, reduces, or controls all current and potential risks to each human or environmental receptor previously identified in Section 2.5, Risk to Human Health and the Environment. A remedy's protectiveness is a qualitative assessment of the degree to which the remedy meets this objective.

3.2 ATTAINMENT OF GROUNDWATER PROTECTION STANDARDS

This objective requires the selected remedy to attain the groundwater protection standards for Table 2 (ARM 16.14.706) chemicals at the relative compliance boundary. These standards were developed in Section 2.2 and are listed on Table 2-2.

2.0 CONSTRUCTIVE ACTION OBJECTIVES

This section begins the process of developing and evaluating constructive measures for remediation of groundwater in the City of Helena. It is intended by establishing the objectives which the related remedy will be expected to achieve. These objectives are outlined in ARM 10.14.703 (7)(b) and include the following:

- Protection of Human Health and the Environment
- Attainment of Groundwater Protection Standards
- Control of Source Area
- Compliance with Waste Management Practices
- Approval by MDHE

The following section details each of the four objectives and the subsequent screening methodology used in the CHA.

3.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This objective requires the related remedy to be protective of human health and the environment. A remedy is protective if it adequately eliminates, reduces, or controls all current and potential risks to each human or environmental receptor previously identified in Section 1.5, Risk to Human Health and the Environment. A remedy's protective nature is a qualitative assessment of the degree to which the remedy meets this objective.

3.2 ATTAINMENT OF GROUNDWATER PROTECTION STANDARDS

This objective requires the related remedy to attain the groundwater protection standards for Table 1 (ARM 10.14.703) chemicals at the relative compliance boundary. These standards were developed in Section 1.5 and are listed on Table 1-2.

3.3 CONTROL OF SOURCE AREA

This objective requires the selected remedy to control the source(s) of release so as to reduce or eliminate further releases of Contaminants of Concern to the environment. This objective may be met by technologies which isolate the waste itself, limit the forming of leachate, or limit the formation and transport of landfill gas.

3.4 COMPLIANCE WITH WASTE MANAGEMENT PRACTICES

This objective requires the selected remedy to comply with waste management practices specified in ARM 16.14.708 (8). This regulation specifies that the selected remedy must be monitored and evaluated for effectiveness. In addition, interim measures and further remedial action may be necessary if the selected remedy cannot be demonstrated to be effective. This requires technologies which are protective of human health and the environment and comply with applicable federal Resource Conservation and Recovery Act (RCRA) requirements.

3.5 APPROVAL BY MDHES

Approval of a preferred remedy by the MDHES will follow review of the corrective measures evaluated in this assessment. MDHES may also consider public comment prior to approving a proposed remedy.

3.6 SCREENING METHODOLOGY

This assessment uses a three-tiered screening methodology to develop a set of applicable alternatives, evaluate each according to required criteria, and propose a preferred remedy. Specific evaluation criteria are required by ARM 16.14.708 (6) (c) and ARM 16.14.708 (7) (c) and are incorporated into the following three levels of evaluation:

- Initial Screening Criteria
- Alternative Evaluation Criteria
- Modifying Criteria

3.3 CONTROL OF SOURCE AREA

This objective requires the selected remedy to control the source(s) of release as is required to eliminate further release of Contaminants of Concern in the environment. This objective may be met by technologies which isolate the waste itself, limit the forming of leachate, or limit the formation and transport of landfill gas.

3.4 COMPLIANCE WITH WASTE MANAGEMENT PRACTICES

This objective requires the selected remedy to comply with waste management practices specified in ARM 16 14-708 (b). This regulation specifies that the selected remedy must be monitored and evaluated for effectiveness. In addition, interim measures and further remedial action may be necessary if the selected remedy cannot be demonstrated to be effective. This requires technologies which are protective of human health and the environment and comply with applicable Federal Resource Conservation and Recovery Act (RCRA) requirements.

3.5 APPROVAL BY AIDERS

Approval of a proposed remedy by the AIDERS will follow review of the executive summary submitted in the assessment. AIDERS may also consider public comment prior to approving a proposed remedy.

3.6 SCREENING METHODOLOGY

This assessment uses a three-tiered screening methodology to develop a set of applicable alternatives, evaluate each according to required criteria, and propose a preferred remedy. Specific evaluation criteria are required by ARM 16 14-708 (a) and ARM 16 14-708 (7) (c) and are incorporated into the following three levels of evaluation:

- Initial Screening Criteria
- Alternative Evaluation Criteria
- Modeling Criteria

Initial screening criteria are those criteria that must be met for a particular process options to be retained for further consideration as potential alternatives. The three initial screening criteria are: technical implementability; effectiveness and protectiveness; and relative costs.

Process options receiving favorable evaluations during the initial screening will then be assembled into alternatives representing varying degrees of complexity. Five alternative evaluation criteria will be used to compare and rank these assembled alternatives. Alternative evaluation criteria are: reliability; ease of implementation; potential impacts; time frame; and costs.

Corrective measure alternatives receiving favorable evaluation during the evaluation of alternatives will be compared with regard to two modifying criteria: technical and economic capability of the owner; and degree to which the remedy addresses community concerns. Modification of the evaluation is allowed under ARM 16.14.708 (7) (c) to allow the operator/owner to select a remedy that can reasonably be implemented yet adequately addresses community concerns.

Initial screening criteria are those criteria that must be met for a particular process option to be considered for further evaluation as potential alternatives. The three initial screening criteria are: technical feasibility, economic viability, and environmental acceptability.

Process options receiving favorable evaluation during the initial screening will then be described in detail as representing varying degrees of complexity. Five alternative evaluation criteria will be used to compare and rank these alternative process options. Alternative evaluation criteria are: technical feasibility, economic viability, environmental acceptability, and social acceptability.

Comparative analysis alternatives receiving favorable evaluation during the evaluation of alternatives will be compared with regard to two modifying criteria: technical and economic. The technical criteria are: technical feasibility, economic viability, and environmental acceptability. The economic criteria are: economic viability, social acceptability, and environmental acceptability.

4.0 IDENTIFICATION AND SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

Many existing remedial technologies could potentially meet the corrective action objectives at the Helena Landfill. Thirty-eight different technologies were qualitatively evaluated during an initial screening process. The technologies which passed this initial screening are then assembled into the six most applicable remedial alternative which will meet the screening criteria, and which meet the project objectives. These six alternative are then evaluated on a more comprehensive basis to identify the preferred remedial alternative (Section 6.0). The initial technology screening process, including the criteria evaluated and the results achieved are described in the following sections.

4.1 INITIAL SCREENING CRITERIA

The initial screening criteria used to compare the thirty-eight potential remedial technologies are as follows:

- *Technical Implementability* - Likelihood that a process option can be implemented as a remedial action with regard to the constraints of site-specific contaminants and conditions (poor, fair good).
- *Effectiveness and Protectiveness* - The ability of the process option to meet the corrective measures objectives and limit adverse impacts to human health and the environment (poor, potential, demonstrated).
- *Relative Costs* - Cost analysis based on engineering judgment as to a process option's costs relative to other process options (low, moderate, high). Cost basis for screening was used as a moderating criteria, and was only used to qualify criteria that were similarly ranked in the other qualifying criteria.

4. IDENTIFICATION AND SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

Many existing remedial technologies could potentially meet the corrective action objectives of the Federal Landfill. Thirty-eight different technologies were qualitatively evaluated during an initial screening process. The technologies which passed this initial screening are then ranked into the six most applicable remedial alternatives which will meet the corrective action, and which meet the project objectives. These six alternatives are then evaluated on a more comprehensive basis to identify the preferred remedial alternative (Section 5.0). The initial technology screening process, including the criteria employed and the results achieved are described in the following sections.

4.1 INITIAL SCREENING CRITERIA

The initial screening criteria used to compare the thirty-eight potential remedial technologies are as follows:

- **Technical Feasibility** - Likelihood that a process option can be implemented as a remedial action with regard to the magnitude of site-specific contamination and conditions (soil, groundwater, etc.).
- **Effectiveness** - The ability of the process option to meet the corrective action objectives and limit adverse impacts to human health and the environment (soil, groundwater, etc.).
- **Relative Cost** - Cost analysis based on engineering judgment as to a process option's relative ability to achieve process objectives (low, moderate, high). Cost basis for screening was set as a remedial cost of \$100,000 per year only used to identify alternatives that were clearly ranked in the cost/quality criteria.

These criteria are consistent with the requirements of ARM 16.14.708, as well as requirements for CERCLA Feasibility Studies (FS). The CERCLA FS process is well established and has found to be effective and defensible in the alternative screening process.

The remedial technologies which were evaluated were categorized into seven "General Response Action" groups. The groups allowed for similar technologies to be not only qualitatively evaluated as to the qualifying criteria, but to be compared to each other and retained or eliminated based on which of the similar technologies is likely to be most effective in meeting the project objectives.

Table 4-1 describes each of the technologies which were evaluated during the initial screening process, and the qualitative ranking for each technology. The table also denotes which of the alternatives were eliminated from further evaluation and the reason that the alternative has been eliminated.

4.2 RESULTS OF THE INITIAL SCREENING PROCESS

A "no action" alternative is typically included in the screening process for comparison with other alternatives, and to provide a cost/benefit comparison. Because several corrective actions have already been implemented at the site, a no action alternative is not appropriate for this CMA. The "Existing Corrective Measures" response has been retained because existing remedial actions will likely have a positive effect on the quality of ground water at the site. In addition, institutional controls already in place effectively limit exposure to contaminants.

The "Limited Action" response, which would provide for more institutional controls and/or water right restrictions was retained because it is consistent with the corrective measures already implemented at the site, and several such controls are already in place.

TABLE 4-1
CORRECTIVE MEASURE TECHNOLOGIES SCREENING

General Response Action	Remedial Technology	Process Option	Description	Technical Implementability	Effectiveness and Protectiveness	Relative Cost	Reason for Elimination	Screening Comments
Existing Corrective Measures and No Further Action	Closure Capping	Monitoring to Evaluate Effectiveness	Continued sampling and analysis	Good	Potential	Low	Retained	No action alternative not appropriate because screened corrective measures have been implemented to date
	Institutional Controls							
	Storm Drain Extension							
Limited Action	Institutional Controls	Alternate water supply	Provide new well or extend municipal water supply	Good	Potential	Low	Retained	Limits exposure to groundwater; may be supplied by potential annexation
		Water right restrictions	Restrict use of groundwater with deed and water right restrictions	Good	Potential	Low	Retained	Limits exposure to groundwater
Containment	Capping	Clay	Limit infiltration and leaching by placing clay cap over uncapped sections of landfill	Good	Potential	High	Does not address VOC migration as gas, other containment technology retained	Impact of infiltration through uncapped sections has not been determined
	Vertical Subsurface Barriers	Slurry walls	Block horizontal groundwater flow with soil/bentonite slurry wall	Fair	Demonstrated	High	Does not address VOC migration as gas, other containment technology retained	Potentially applicable in concert with hydraulic controls; excessive depths; extremely high costs
		Sheet piling	Block horizontal groundwater flow with interlocked sheet piling	Fair	Potential	High	Does not address VOC migration as gas, other containment technology retained	Limited additional benefit over hydraulic controls; significantly higher costs
		Grout curtain	Inject grout to create a groundwater flow barrier	Fair	Potential	High	Does not address VOC migration as gas, other containment technology retained	Limited additional benefit over hydraulic controls; significantly higher costs
	Hydraulic Controls	Drilled wells	Establish a groundwater flow barrier with drilled extraction wells	Good	Demonstrated	Moderate	Retained	Very applicable for this site; may have broad impact on shallow aquifer
		Excavated trenches	Establish a groundwater flow barrier with excavated trenches backfilled with porous media	Poor	Poor	High	More applicable containment technology available, physically prohibitive	Physically prohibitive at anticipated depths to groundwater

TABLE 4-1 (continued)
CORRECTIVE MEASURE TECHNOLOGIES SCREENING

General Response Action	Remedial Technology	Process Option	Description	Technical Implementability	Effectiveness and Protectiveness	Relative Cost	Reason for Elimination	Screening Comments
Collection	Groundwater Extraction	Extraction wells	Collect contaminated groundwater with drilled extraction wells	Good	Demonstrated	Moderate	Retained	Applicable for hydraulic control of groundwater
		Excavated trenches	Extract contaminated groundwater with excavated trenches backfilled with porous media	Poor	Poor	High	More applicable containment technology available, physically prohibitive	Physically prohibitive at anticipated depths to groundwater
		Landfill gas extraction wells	Remove and/or limit contaminant in groundwater by extracting landfill gases	Good	Potential	Moderate	Retained	Established technology with newly recognized benefits for groundwater remediation
Direct Treatment	Physical/Chemical	Air stripping	Phase separation of dissolve contaminants by forced air	Good	Demonstrated	Low	Retained	Well suited for VOCs; may require treatment of air emissions
		Steam stripping	Phase separation of dissolve contaminants by heat and forced air	Good	Demonstrated	Moderate	More applicable direct treatment process retained	Operates on air stripping principle with increased transfer efficiency; significantly more costly
		Adsorption	Phase separation of dissolve contaminants by adsorption onto GAC or other media	Good	Demonstrated	High	Retained	Well suited for VOCs; high operation and maintenance costs, low capital costs
		Reductive dehalogenation	Initiate dehalogenation and degradation of dissolved contaminants by filtering through iron filings	Fair	Potential	Low	More applicable direct treatment process retained	Innovative technology under development at the University of Waterloo; requires treatability study
		Ion exchange	Physical separation of dissolve contaminants using selected resins	Poor	Poor	Moderate	More applicable direct treatment process retained	Applicable for ionic contaminants only
		Reverse Osmosis	Physical separation of dissolved contaminants using semi-permeable membranes	Poor	Poor	High	More applicable direct treatment process retained	Not applicable for VOCs

TABLE 4-1 (continued)
CORRECTIVE MEASURE TECHNOLOGIES SCREENING

General Response Action	Remedial Technology	Process Option	Description	Technical Implement-ability	Effectiveness and Protectiveness	Relative Cost	Reason for Elimination	Screening Comments
Direct Treatment (continued)	Physical/Chemical (continued)	Freeze crystallization	Initiate freezing to cause phase separation of dissolved contaminants	Poor	Poor	High	More applicable direct treatment process retained	Requires very high concentrations
		Evaporation	Evaporate contaminants in surface ponds or by spray irrigation	Good	Demonstrated	Low	Retained	Efficiency is weather dependent; requires ponds for winter storage
Biological		Oxidation	Chemical, photo-oxidation, or other oxidation of dissolved contaminants	Good	Demonstrated	Moderate	More applicable direct treatment process retained	Cost competitive with air stripping when emissions requirements are significant
		Aerobic	Microbial decomposition	Fair	Potential	Moderate	More applicable direct treatment process retained	Requires treatability study; compounds more halogenated than vinyl chloride require reductive dehalogenation
		Anaerobic	Microbial decomposition	Fair	Potential	Moderate	More applicable direct treatment process retained	Requires treatability study; may require aerobic follow-up for degradation of daughter products
Thermal Destruction		Rotary kiln	Combustion in a horizontal rotary cylinder	Fair	Potential	High	More applicable direct treatment process retained	High cost; consumptive energy use; requires treatability study
		Fluidized bed	Inject dissolved contaminants into super-heated bed of sand	Fair	Potential	High	More applicable direct treatment process retained	High cost; consumptive energy use; requires treatability study
		Wet air oxidation	High pressure/temperature thermal oxidation	Fair	Potential	High	More applicable direct treatment process retained	High cost; consumptive energy use; requires treatability study
Off-site		POTW	Pipe to local POTW for treatment	Fair	Demonstrated	Moderate	Retained	Based on POTW's ability to handle quantity and quality of water
		TSDF	Transport to TSDF	Poor	Potential	High	More applicable direct treatment process retained	Estimated extraction rates too high for effective transport

TABLE 4-1 (continued)
CORRECTIVE MEASURE TECHNOLOGIES SCREENING

General Response Action	Remedial Technology	Process Option	Description	Technical Implementability	Effectiveness and Protectiveness	Relative Cost	Reason for Elimination	Screening Comments
In-Situ Treatment	Physical/Chemical	Oxidation	Inject and extract oxidants to oxidize dissolved contaminants in-situ	Fair	Potential	High	More applicable in-situ treatment process retained	May mobilize more toxic daughter products such as vinyl chloride
		Air sparging	Strip dissolved contaminants from groundwater by forced air injection	Fair	Potential	Moderate	Retained	Air compressibility results in preferential flow paths and limiting treatment
	Biological	Aerobic	Microbial decomposition	Fair	Potential	Moderate	More applicable in-situ treatment process retained	Difficult to maintain appropriate microbial conditions in-situ
		Anaerobic	Microbial decomposition	Fair	Potential	Moderate	More applicable in-situ treatment process retained	Difficult to maintain appropriate microbial conditions in-situ
Discharge (after direct treatment)	Thermal	Steam sparging/vapor extraction	Strip dissolved contaminants from groundwater by forced steam injection and vacuum extraction	Fair	Potential	High	More applicable in-situ treatment process retained	Limited additional benefits over air sparging; excessive energy costs
		Irrigation	Use treated groundwater for golf course irrigation	Good	Demonstrated	Low	Retained	Requires cold weather water storage or transfer to POTW
	Subsurface	Injection wells	Pump treated groundwater back into shallow aquifer	Good	Demonstrated	Moderate	More applicable discharge alternative retained	High operation requirements; may be used to enhance hydraulic control
		Infiltration gallery	Infiltrate treated groundwater to the shallow aquifer through infiltration galleries or trenches	Good	Demonstrated	Moderate	Retained	Very applicable for this site; nearby storm water infiltration gallery has performed adequately
POTW TSDF	Off-site	POTW	Pipe to local POTW for treatment	Good	Demonstrated	Moderate	More applicable discharge alternative retained; treated groundwater need not be added to the POTW flows	Based on POTW's ability to handle quantity and quality of water
		TSDF	Transport to TSDF	Poor	Potential	High	More applicable discharge alternative retained	Estimated extraction rates too high for effective transport
Publicly owned treatment works Treatment and Storage Disposal Facility		GAC		Granular activated carbon				

Several "Containment" technologies were evaluated. All of the physical containment barrier technologies were eliminated because they did not effectively address the landfill gas VOC migration, and the depth to groundwater at much of the site would be technically and economically prohibitive for construction of the barriers. Containment of groundwater using extraction wells to obtain hydraulic control of the plume area was retained for further evaluation because this technology is well proven and established, and because it is more applicable at the site than the other potential containment technologies.

Collection technologies for both groundwater and landfill gas were evaluated. These technologies would need to be combined with treatment and discharge technologies. The collection of groundwater and landfill gas extraction wells is feasible at the site. These technologies were retained for further evaluation.

Several technologies for treating the collected groundwater, including physical, chemical, biological, thermal, and off-site processes, were evaluated during the initial screening process. Air-stripping was retained because it is a well proven, highly effective treatment for VOC's and has operational and economic advantages over most of the other technologies screened. Adsorption by granular activated carbon (GAC) canisters was retained in the event that further analyses of extraction flow rates and VOC concentrations indicate that GAC results in an economic advantage over air stripping. Evaporation/UV destruction of VOC's was also retained as this was considered an innovative technology with substantial economic advantages and would maintain a beneficial use for the water collected. This process would likely require some treatability testing to prove its effectiveness. Treatment at the local publicly owned treatment works (POTW) was retained as an alternative because it may prove to be cost effective, and also may be necessary for use in conjunction with the other direct treatment alternatives.

Physical, chemical, biological, and thermal in-situ remediation technologies were screened. Based on the qualifying criteria, and the proven effectiveness of air-sparging on a wide variety

of volatile compounds, air-sparging was considered the most effective in-situ technology and was retained for further evaluation.

Two processes for discharge of collected water including irrigation and infiltration were retained for further evaluation. Each of these alternatives are technically and economically feasible and may be used in conjunction with one another to provide efficient disposal of collected and treated groundwater.

Table 4-2 is a summary showing all of the technologies which were retained for further evaluation after the initial screening process. These technologies are assembled into six applicable comprehensive remedial alternatives in Section 5.0.

Direct Treatment	Extraction Wells	Extraction wells
	Landfill Gas Extraction	Landfill gas extraction wells
	Physical/Chemical	Air stripping
In-Situ Treatment	Physical/Chemical	Adsorption (GAC)
	Physical/Chemical	Evaporation
	Thermal Desorption	Landfill gas flare
Disposal	Off-site	POTW
	Physical/Chemical	Air sparging
	Surface	Irrigation
	Subsurface	Infiltration gallery

PAC: Groundwater with high organic
POTW: Publicly owned treatment works

of volatile compounds, air-sparging was considered the most effective in-situ technology and was retained for further evaluation.

Two processes for discharge of collected water including infiltration and infiltration were retained for further evaluation. Each of these alternatives are technically and economically feasible and may be used in conjunction with one another to provide efficient disposal of collected and treated groundwater.

Table 4-2 is a summary showing all of the technologies which were retained for further evaluation after the initial screening process. These technologies are summarized into six applicable comparative treatment alternatives in Section 5.0.

TABLE 4-2
SUMMARY OF RETAINED PROCESS OPTIONS

General Response Action	Remedial Technology	Retained Process Option
Existing Corrective Action	Closure/Capping/ Institutional Controls/ Storm Drain Extension	Monitoring
Limited Action	Institutional Controls	Alternate water supply
Containment	Hydraulic Controls	Drilled wells
Collection	Groundwater Extraction	Extraction wells
	Landfill Gas Extraction	Landfill gas extraction wells
Direct Treatment	Physical/Chemical	Air stripping
		Adsorption (GAC)
		Evaporation
	Thermal Destruction	Landfill gas flare
	Off-site	POTW
In-Situ Treatment	Physical/Chemical	Air sparging
Discharge	Surface	Irrigation
	Subsurface	Infiltration gallery

GAC Granular activated carbon
POTW Publicly owned treatment works

5.0 DEVELOPMENT OF ALTERNATIVES

A particular remedial technology may have several different process options which represent the different manners in which the technology can be implemented and do not usually represent a complete remedy by themselves. A remedy consists of several process options which collectively address the performance objectives. Therefore, process options that were retained during the initial screening (Section 4.0) were assembled into collections of processes which each represent a comprehensive alternative for remediation of groundwater. An effort was made to include process options which include treatment and containment technologies while presenting a range of alternatives which represent varying degrees of complexity and cost. The following six alternatives were assembled during the development of alternatives:

- Existing Corrective Action
- Landfill Gas Extraction/Landfill Gas Flare
- In-Situ Air Sparging
- Extraction/Discharge to POTW for Treatment
- Extraction/Evaporation/Seasonal Discharge to POTW
- Extraction/Direct Treatment/Discharge

All process options retained and listed in Table 4-1 were used in the development of at least one alternative. Table 5-1 lists each of the six alternatives and the specific process options which they use. The following sections briefly describe each alternative and its various components.

5.1 ALTERNATIVE 1 - EXISTING CORRECTIVE ACTION

This corrective measure alternative involves groundwater monitoring, continued institutional controls and existing corrective action recently implemented at the landfill site.

2.0 DEVELOPMENT OF ALTERNATIVES

A particular remedial technology may have several different process options which represent the different manner in which the technology can be implemented and do not usually represent a complete remedy by themselves. A remedy consists of several process options which collectively address the performance objectives. Therefore, process options that were retained during the initial screening (Section 4.0) were assembled into collections of processes which each represent a comprehensive alternative for remediation of groundwater. An effort was made to include process options which include treatment and containment technologies. While presenting a range of alternatives which represent varying degrees of complexity and cost. The following alternatives were assembled during the development of alternatives:

- Existing Corrective Action
- Landfill Gas Extraction and Gas Flare
- In-Situ Air Sparging
- Extraction Discharge to POTW for Treatment
- Extraction/Sparging/Recovery Discharge to POTW
- Extraction/Sparging/Recovery Discharge

All process options retained and listed in Table 2-1 were used in the development of at least one alternative. Table 2-1 lists each of the six alternatives and the specific process options which they use. The following sections briefly describe each alternative and its various components:

2.1 ALTERNATIVE 1 - EXISTING CORRECTIVE ACTION

This corrective measure alternative involves groundwater monitoring, continued institutional controls and existing corrective action remedy implemented at the landfill site.

**TABLE 5-1
ASSEMBLED ALTERNATIVES**

General Response Action	Remedial Technology	Process Option	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
			Existing Corrective Action	Landfill Gas Extraction/ Landfill Gas Flare	In-Situ Air Sparging	Extraction/ Discharge to POTW for Treatment	Extraction/ Evaporation/ Seasonal POTW Treatment	Extraction/ Direct Treatment/ Discharge
No Action	None	Monitoring	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾
Limited Action	Institutional Controls	Alternate water supply	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾
		Water right restrictions	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾	• ⁽¹⁾
Containment	Hydraulic Controls	Drilled wells				•	•	•
Collection	Groundwater Extraction	Extraction wells				•	•	•
	Landfill Gas Extraction	Landfill gas extraction wells		•				
Direct Treatment	Physical/ Chemical	Air stripping						• ⁽²⁾
		Adsorption (GAC)						• ⁽²⁾
		Evaporation					•	
In-Situ Treatment	Thermal Destruction Off-site	Landfill gas flare		•				
		POTW				•	•	
Discharge (after treatment)	Physical/ Chemical	Air sparging			•			
	Surface	Irrigation					•	• ⁽¹⁾
	Subsurface	Infiltration gallery						• ⁽³⁾

POTW Publicly owned treatment works
GAC Granular activated carbon

- (1) All alternatives include monitoring and institutional controls
 (2) Direct treatment may be either air stripping or GAC based on further analysis
 (3) Discharge method may be either irrigation or infiltration gallery based on further analysis

5.1.1 Groundwater Monitoring

Continued groundwater monitoring is required under ARM 16.14.701 and is included in all six alternatives presented in this assessment. The current groundwater monitoring program includes analyzing samples from 27 monitoring and residential wells for 250 chemical constituents two times every year. This program is detailed in the Helena Landfill Sampling and Analysis Plan (Hydrometrics, 1993). If water quality is degrading, monitoring will provide advance warning that additional corrective measure may be necessary. Likewise, continued monitoring will indicate whether the alternative selected is resulting in improved groundwater quality and attainment of groundwater protection standards.

5.1.2 Institutional Controls

Existing institutional controls are also included in all six developed alternatives. Existing city ordinances require each residence within city limits to connect to the city water supply for potable water use (Title 3, Chapter 2, Section 10). This ordinance greatly reduces the potential for human exposure by providing an alternative potable water source other than the impacted groundwater. Additional wells within the city limits also are prohibited by a ban on well drilling within city limits (Title 3, Chapter 11), thereby restricting access to impacted groundwater. Title 3, Chapter 11, Section 3 requires that there be no cross-connection between any private wells and the City water distribution system. These institutional controls are protective of human health by limiting potential exposure pathways.

5.1.3 Existing Corrective Action

Three significant landfill corrective measures have recently been implemented at the landfill site: landfill closure; clay capping; and storm drain extension. These measures are detailed in the Helena Landfill Closure Plan (Hydrometrics, 1994). The location of these corrective measures is indicated on Figure 5-1. Closure of the landfill in 1994 prevents addition of any waste to the site and controls the source area by limiting its volume. This measure controls and limits potential future releases of all types of

5.1.1 Groundwater Monitoring

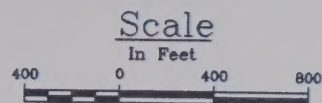
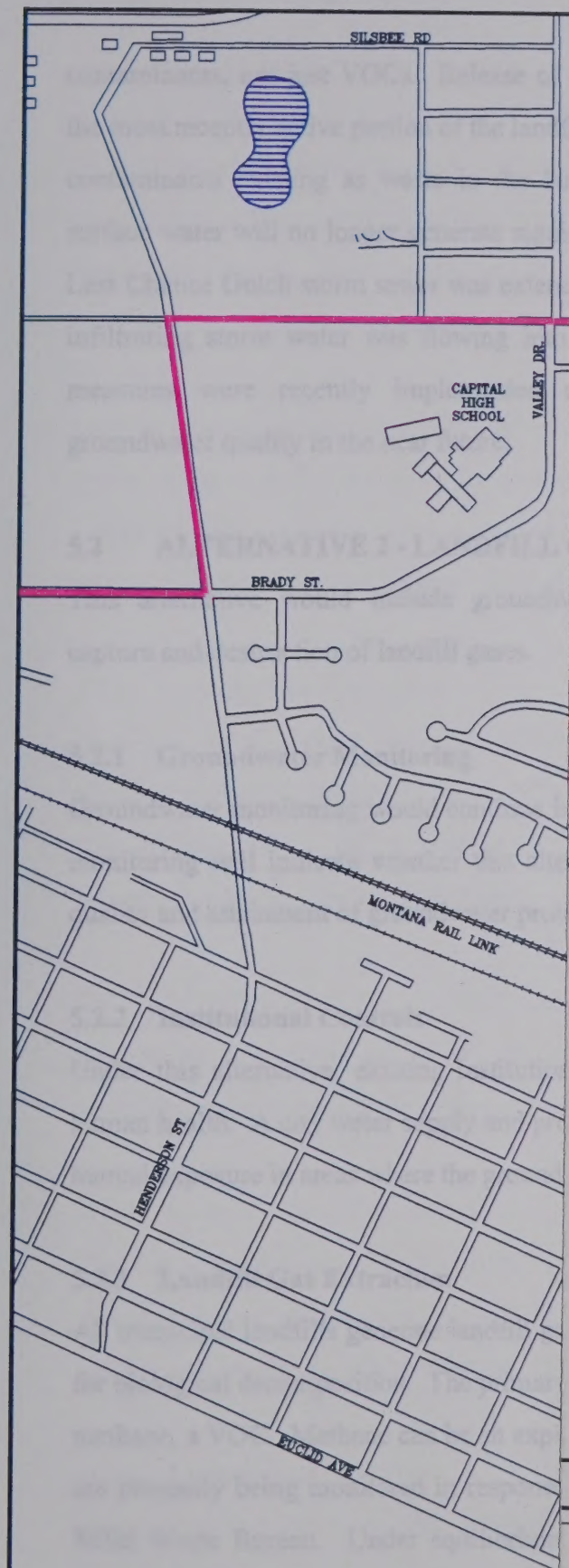
Groundwater monitoring is required under AEM 16.14.701 and is included in all site-specific permits in this assessment. The current groundwater monitoring program includes monitoring samples from 27 monitoring and recharge wells for 130 chemical constituents two times every year. This program is detailed in the Health Risk Assessment and Analysis Plan (Hydromonitors, 1997). If water quality is degrading, monitoring will provide advance warning for additional corrective measures may be necessary. Likewise, continued monitoring will indicate whether the alternative selected is resulting in improved groundwater quality and attainment of groundwater protection standards.

5.1.2 Institutional Controls

Existing institutional controls are also included in all site-specific permits. Existing city ordinances require each residence within city limits to connect to the city water supply for potable water use (Title 1, Chapter 1, Section 10). This ordinance greatly reduces the potential for human exposure by providing an alternative potable water source other than the impacted groundwater. Additional wells within the city limits also are prohibited by a ban on well drilling within city limits (Title 1, Chapter 11). thereby restricting access to impacted groundwater. Title 1, Chapter 11, Section 3 requires that there be no cross-connection between any private wells and the City water distribution system. These institutional controls are protective of human health by limiting potential exposure pathways.

5.1.3 Existing Corrective Action

Three significant landfill corrective measures have recently been implemented at the landfill site: landfill closure, clay capping, and storm drain extension. These measures are detailed in the Health Risk Assessment Plan (Hydromonitors, 1997). The location of these corrective measures is indicated in Figure 2-1. Closure of the landfill in 1994 prevents addition of any waste to the site and controls the source area by limiting its volume. This measure controls and limits potential future releases of all types of



Legend

-  Storm Drain Extension
-  Alternative Water Supply Boundary
-  Clay Cap

Hydrometrics, Inc.

Figure 5-1
Alternative 1:
Existing Corrective Measures
City of Helena Landfill
Helena, Montana

5.1.1 Groundwater Monitoring

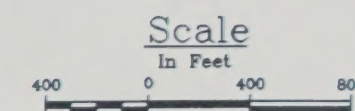
Continuous groundwater monitoring is required under ARMI 16.1.7(1) and is included in all six alternatives presented in this assessment. The current groundwater monitoring program includes analyzing samples from 10 monitoring and vented wells for 150 chemical constituents two times every year. This program is detailed in the Helona Landfill Cleanup Plan (Hydromonitor, 1991). If water quality is degrading, monitoring will provide advance warning that additional corrective measures may be necessary. Likewise, continued monitoring will indicate whether the alternative selected is resulting in improved groundwater quality and attainment of groundwater protection standards.

5.1.2 Institutional Controls

Existing institutional controls are also included in all six developed alternatives. Existing city ordinances require each resident within city limits to connect to the city water supply for potable water use (Title 5, Chapter 2, Section 10). This ordinance greatly reduces the potential for human exposure by providing an alternative potable water source other than the impacted groundwater. Additional wells within the city limits also are prohibited by a ban on well drilling within city limits (Title 5, Chapter 11). thereby restricting access to impacted groundwater. Title 5, Chapter 11, Section 3 requires that there be no cross-connection between any private wells and the City water distribution system. These institutional controls are protective of human health by limiting potential exposure pathways.

5.1.3 Existing Corrective Action

Three significant landfill corrective measures have recently been implemented at the landfill site: landfill closure, clay capping, and storm drain extension. These measures are detailed in the Helona Landfill Cleanup Plan (Hydromonitor, 1991). The location of these corrective measures is indicated in Figure 5-1. Closure of the landfill in 1994 prevented addition of any waste to the site and controls the source area by limiting its volume. This measure controls and limits potential future release of all types of



Legend

- Storm Drain Extension
- Alternative Water Supply Boundary
- Clay Cap

Hydrometrics, Inc.

Figure 5-1
Alternative 1:
Existing Corrective Measures
City of Helena Landfill
Helena, Montana



contaminants, not just VOCs. Release of contaminants was further limited by capping the most recently active portion of the landfill during 1994. The mobility of any potential contaminants existing as waste in the landfill is reduced now that precipitation and surface water will no longer generate significant amounts of landfill leachate. Also, the Last Chance Gulch storm sewer was extended past the landfill after it was suspected that infiltrating storm water was flowing into the landfill and generating leachate. These measures were recently implemented and should have measurable impacts on groundwater quality in the near future.

5.2 ALTERNATIVE 2 - LANDFILL GAS EXTRACTION AND TREATMENT

This alternative would include groundwater monitoring, institutional controls, and capture and destruction of landfill gases.

5.2.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.701. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards

5.2.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

5.2.3 Landfill Gas Extraction

All municipal landfills generate landfill gases as long as organic wastes remain available for biological decomposition. The primary landfill gas generated at the Helena Landfill is methane, a VOC. Methane can be an explosive gas and concentrations within the landfill are presently being monitored in response to public safety issues raised by the MDHES Solid Waste Bureau. Under equilibrium, all VOCs have partitioning constants which govern the fraction of the constituent existing as vapor and dissolved in groundwater.

contaminants, but not VOCs. Release of contaminants was further limited by capping the most recently active portion of the landfill during 1994. The mobility of any potential contaminants existing as waste in the landfill is reduced now that precipitation and surface water will no longer generate significant amounts of landfill leachate. Also, the 1.5M C and S (Claystone) cover was extended past the landfill after it was suspected that infiltrating storm water was flowing into the landfill and generating leachate. These measures were recently implemented and should have measurable impacts on groundwater quality in the near future.

2.1 ALTERNATIVE 1 - LANDFILL GAS EXTRACTION AND TREATMENT

This alternative would include groundwater monitoring, institutional controls, and capture and destruction of landfill gas.

2.1.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARMI 15.14.101. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

2.1.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

2.1.3 Landfill Gas Extraction

All municipal landfill gas vents landfill gas as long as organic waste remains available for biological degradation. The primary landfill gas generated at the Helix Landfill is methane, a VOC. Methane can be an explosive gas and contribute to global warming. The MCHES are presently being installed in response to public safety issues raised by the MCHES. Solid Waste Bureau. Under this alternative, all VOCs have permitting constraints which govern the fraction of the constituent existing as vapor and dissolved in groundwater.

Removal of methane and other landfill gases will undoubtedly lower the concentrations of VOCs existing as landfill gases and cause more VOC to volatilize from the dissolved groundwater plume. Extraction would also volatilize VOCs existing as liquids within the buried solid waste. Small reductions in dissolved VOCs are likely to have an impact sufficient to attain groundwater protection standards at the relative compliance boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the buried solid waste as shown in Figure 5-2. An explosion-proof blower would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow to the well and be removed from the landfill area.

5.2.4 Landfill Gas Treatment

Extracted landfill gases are most commonly treated by thermal destruction. This alternative would include destruction of landfill gases, including VOCs, in a landfill gas flare (Figure 5-3). This treatment method is effective at removing VOCs and is commonly used at solid waste landfills.

5.3 ALTERNATIVE 3 - IN-SITU AIR SPARGING

Alternative 3 provides for in-situ air sparging of impacted groundwater as well as continued monitoring and institutional controls.

5.3.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.701. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

5.3.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

Removal of methane and other landfill gases will undoubtedly lower the concentrations of VOCs existing in landfill gases and cause more VOC to migrate from the dissolved groundwater phase. Extraction would also reduce VOC existing in liquids within the porous solid waste. Small reductions in dissolved VOCs are likely to have no impact sufficient to meet groundwater protection standards at the relative concentration boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the landfill waste as shown in Figure 2-5. An extraction-purge system would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow in the well and be removed from the landfill area.

2.2.1 Landfill Gas Treatment

Extracted landfill gas is most commonly treated by thermal destruction. This alternative would include destruction of landfill gases including VOCs in a landfill gas flare (Figure 2-6). This treatment method is effective at removing VOCs and is commonly used at solid waste landfills.

2.3 ALTERNATIVE 3 - IN-SITU AIR SPARGING

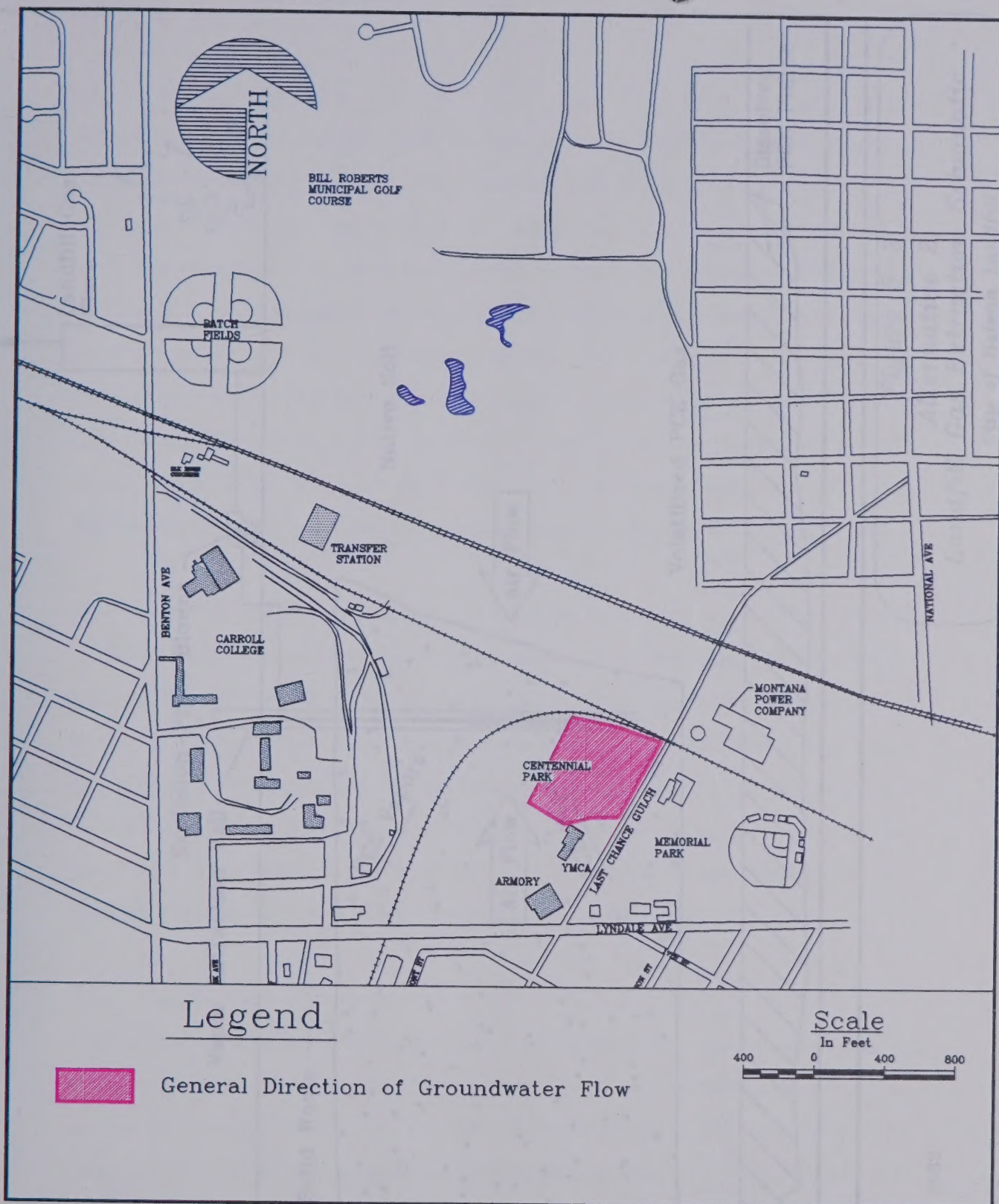
Alternative 3 provides for in-situ air sparging of impacted groundwater as well as continuous monitoring and treatment controls.

2.3.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.701. Continuous monitoring will include whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

2.3.2 Remedial Controls

Under this alternative, existing treatment and controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.



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Figure 5-2
Alternative 2:
Landfill Gas Extraction and Treatment
 City of Helena Landfill
 Helena, Montana



Hydrometries, Inc.
 1000 West 10th Street
 Suite 100
 Minneapolis, MN 55408
 Phone: (612) 338-1000
 Fax: (612) 338-1001
 E-mail: info@hydrometries.com
 Web: www.hydrometries.com

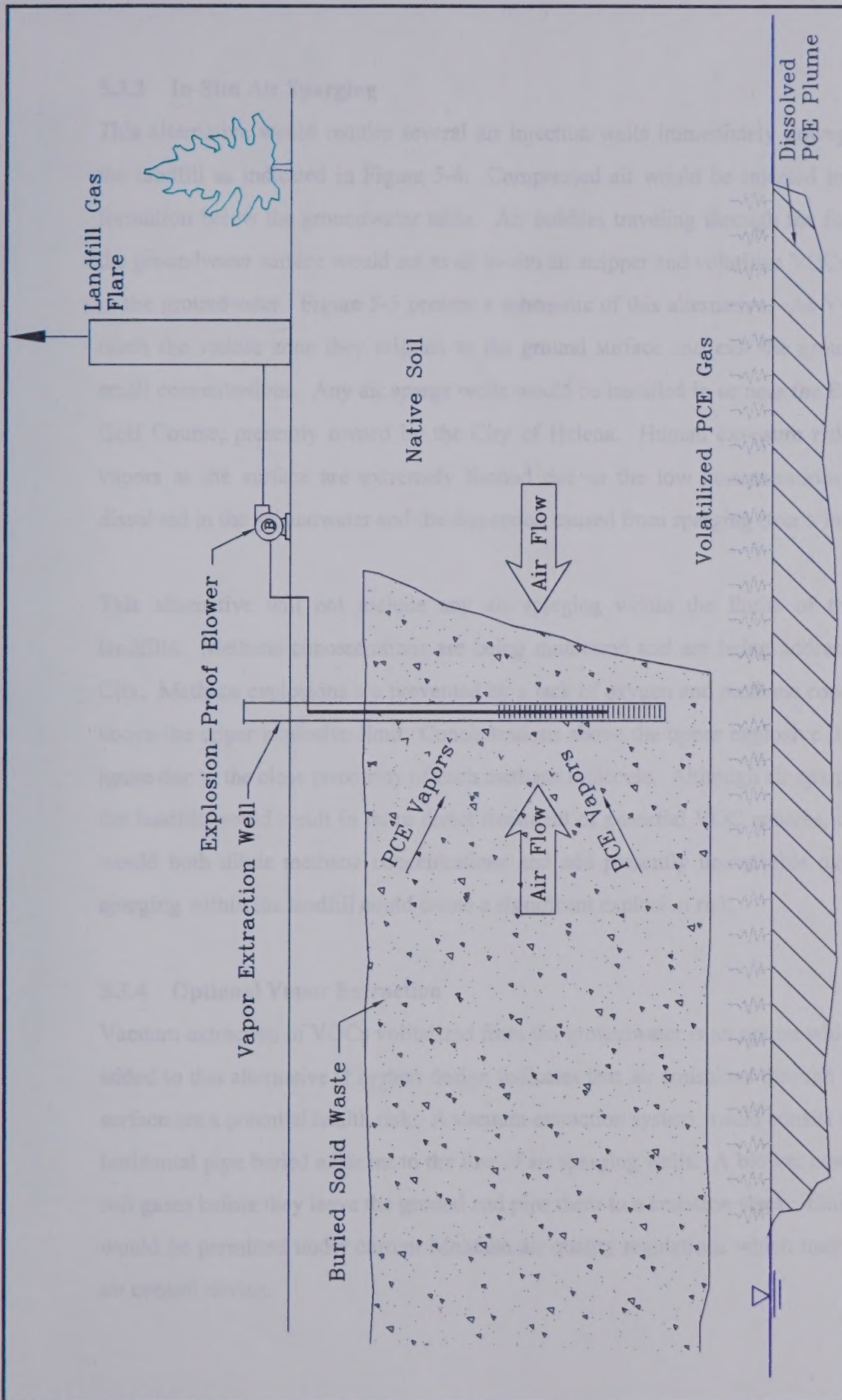


Figure 5-3
Alternative 2:
Landfill Gas Extraction Schematic
City of Helena Landfill
Helena, Montana

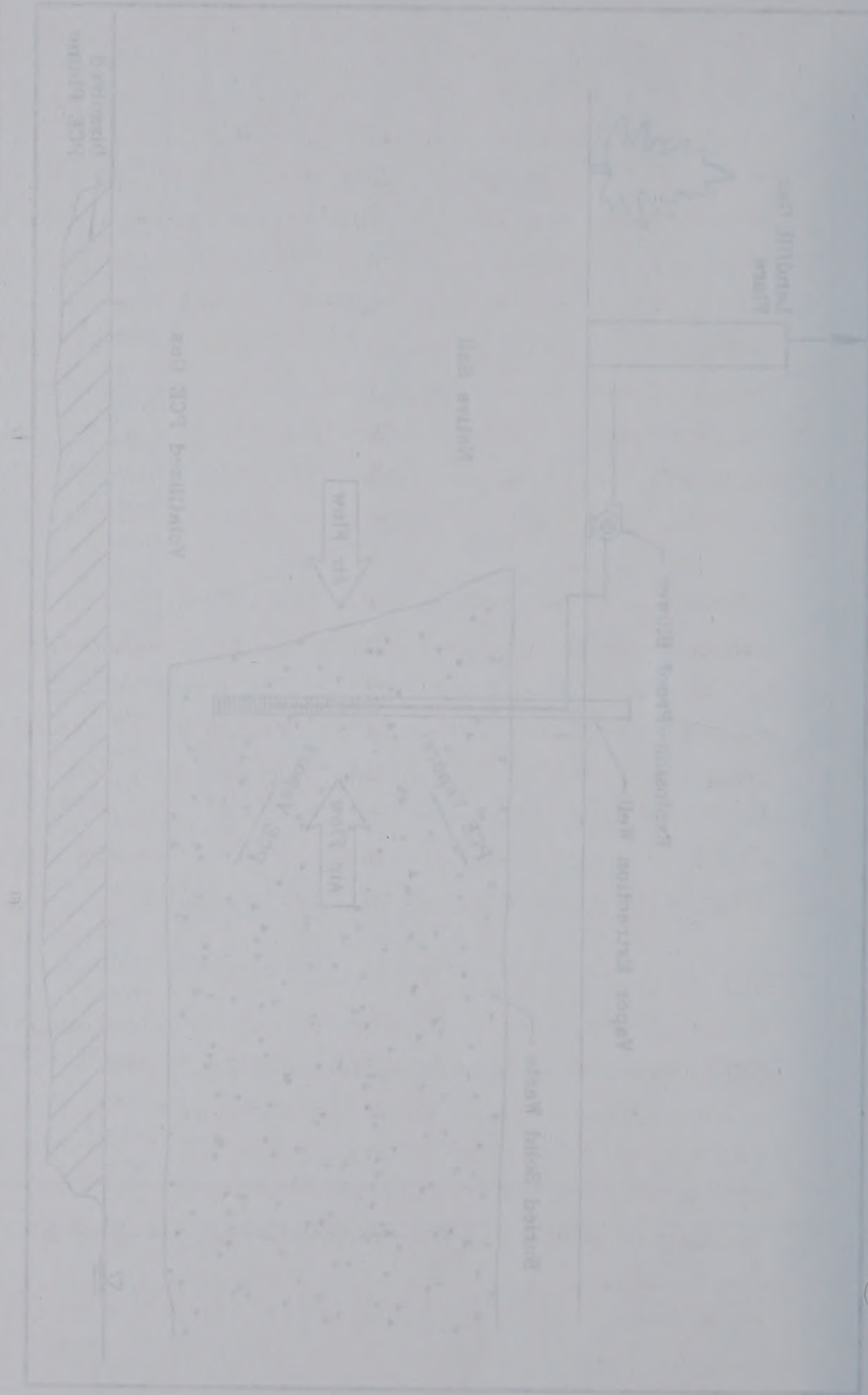
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Hydrogeologic map

Scale 1:50,000
Date 1980
Sheet 1 of 1

Legend

1. Alluvial deposits
2. Sandstone
3. Limestone
4. Shale
5. Clay



5.3.3 In-Situ Air Sparging

This alternative would require several air injection wells immediately downgradient of the landfill as indicated in Figure 5-4. Compressed air would be injected into the soil formation below the groundwater table. Air bubbles traveling through the formation to the groundwater surface would act as an in-situ air stripper and volatilize VOCs dissolved in the groundwater. Figure 5-5 present a schematic of this alternative. As VOC vapors reach the vadose zone they migrate to the ground surface and exit the ground at very small concentrations. Any air sparge wells would be installed in or near the Bill Roberts Golf Course, presently owned by the City of Helena. Human exposure risks to VOC vapors at the surface are extremely limited due to the low concentrations of VOCs dissolved in the groundwater and the dispersion caused from sparging over a large area.

This alternative will not include any air sparging within the limits of the existing landfills. Methane concentrations are being monitored and are being addressed by the City. Methane explosions are prevented by a lack of oxygen and methane concentrations above the upper explosive limit. Concentrations above the upper explosive limit cannot ignite due to the close proximity of each methane molecule. Although air sparging within the landfill would result in more direct treatment of potential VOC sources, injected air would both dilute methane concentrations and add presently unavailable oxygen. Air sparging within the landfill could create a significant explosion risk.

5.3.4 Optional Vapor Extraction

Vacuum extraction of VOCs volitalized from the groundwater is an option which may be added to this alternative if system design indicates that air emissions through the ground surface are a potential health risk. A vacuum extraction system would consist of a slotted horizontal pipe buried adjacent to the line of air sparging wells. A blower would remove soil gases before they leave the ground and pipe them to a emission stack. Emitted VOCs would be permitted under current Montana air quality regulations which may require an air control device.

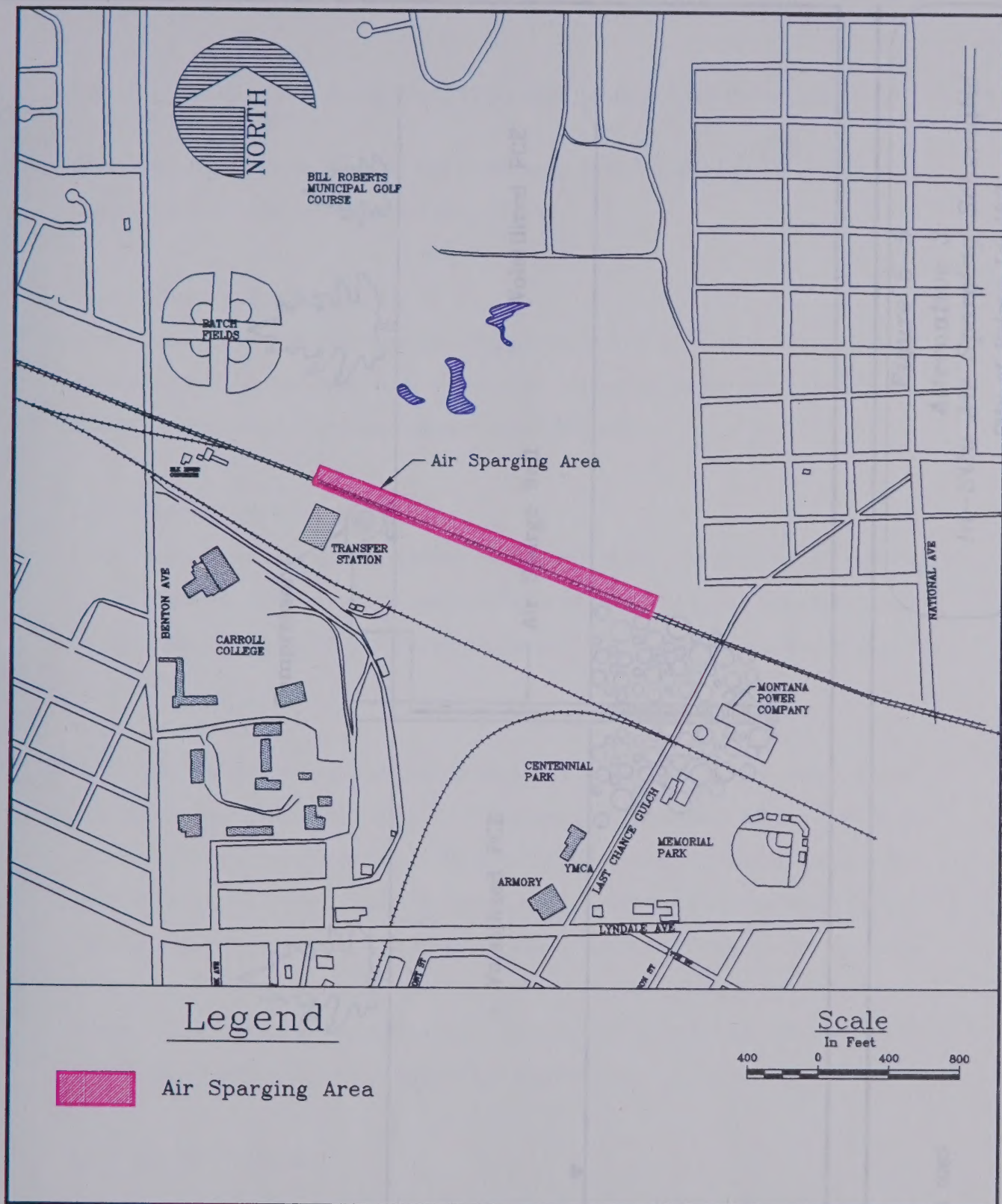
2.3.3 In-Situ Air Sparging

This alternative would require several air injection wells installed throughout the landfill as indicated in Figure 2-4. Compressed air would be injected into the soil formation below the groundwater table. Air bubbles traveling through the formation in the groundwater would act as an in-situ air trigger and volatilize VOCs dissolved in the groundwater. Figure 2-2 presents a schematic of this alternative. As VOC vapors reach the surface they migrate to the ground surface and exit the ground at very small concentrations. Any air sparging wells would be installed in or near the Bill Roberts Golf Course, presently owned by the City of Houston. Human exposure risks to VOC vapors at the surface are extremely limited due to the low concentrations of VOCs dissolved in the groundwater and the dispersion caused from sparging over a large area.

This alternative will not include any air sparging within the limits of the existing landfill. Methane concentrations are being monitored and are being addressed by the City. Methane explosions are prevented by a lack of oxygen and methane concentrations above the upper explosive limit. Concentrations above the upper explosive limit cannot ignite due to the close proximity of each methane molecule. Although air sparging within the landfill would result in more direct treatment of potential VOC sources, injected air would not dilute methane concentrations and not potentially liberate oxygen. Air sparging within the landfill could create a significant explosion risk.

2.3.4 Optional Vapor Extraction

Vacuum extraction of VOCs collected from the groundwater is an option which may be added to this alternative if system design indicates that air emissions through the ground surface are a potential health risk. A vacuum extraction system would consist of a closed horizontal pipe buried adjacent to the line of air sparging wells. A blower would remove soil gases before they leave the ground and pass them to a condensation stack. Extracted VOCs would be permitted under current Houston air quality regulations which may require an air control device.



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Figure 5-4
Alternative 3:
In-Situ Air Sparging
 City of Helena Landfill
 Helena, Montana



5.4 ALTERNATIVE 4 - EXTRACTION/DISCHARGE TO POTW FOR TREATMENT

This alternative includes groundwater extraction, volatilization, and discharge to POTW for treatment. The extraction wells are located in the center of the landfill, and the discharge is to the POTW.

5.4.1 Groundwater Extraction

Groundwater extraction wells are located in the center of the landfill, and the discharge is to the POTW. The extraction wells are located in the center of the landfill, and the discharge is to the POTW.

5.4.2 Volatilization

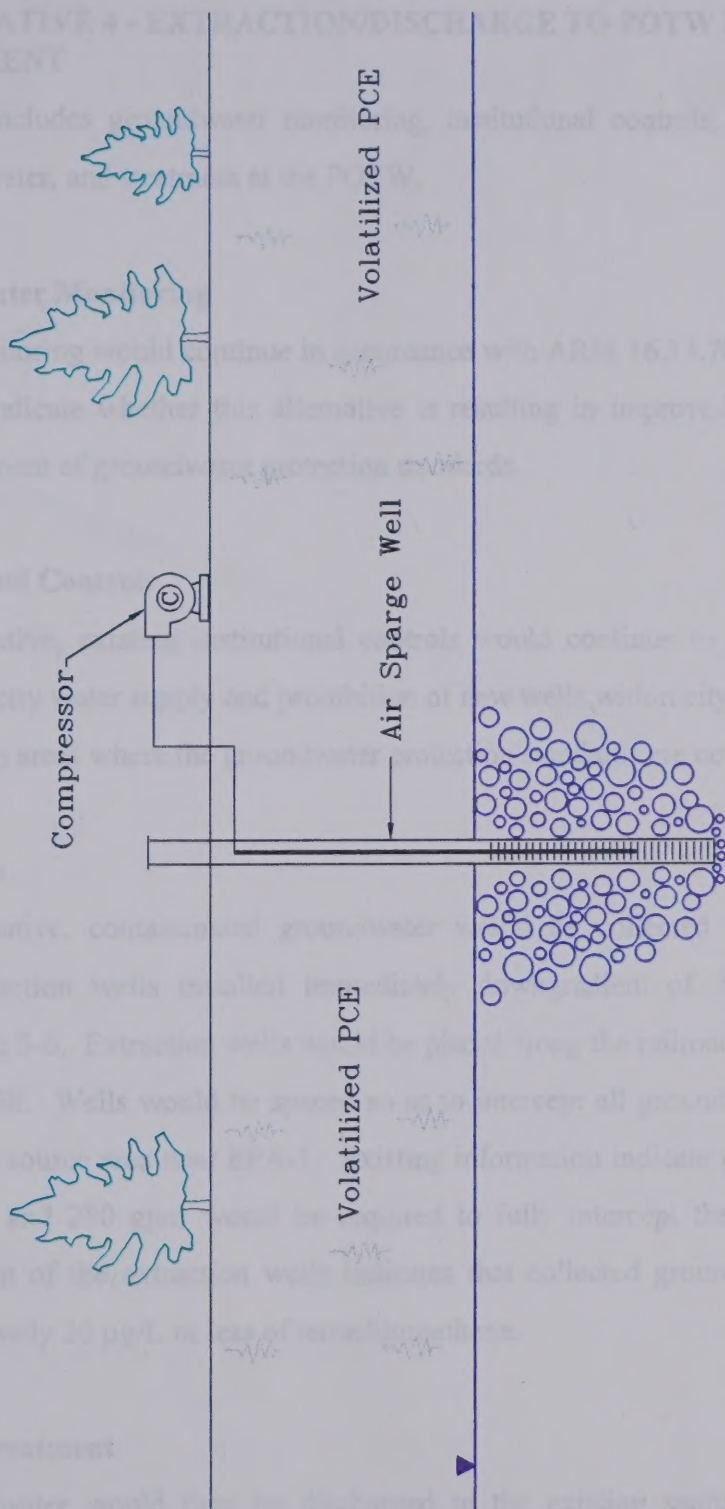
Under this alternative, the extracted groundwater is treated by volatilization. The volatilization process involves the transfer of volatile organic compounds (VOCs) from the liquid phase to the gas phase.

5.4.3 Extraction

Under this alternative, contaminated groundwater is extracted from the landfill. The extraction wells are located in the center of the landfill, and the discharge is to the POTW. The extraction wells are located in the center of the landfill, and the discharge is to the POTW.

5.4.4 POTW Treatment

Extracted groundwater would be discharged to the existing sanitary sewer system for treatment at the POTW (Figure 5-7). Treatment processes at the POTW include biological and physical processes which are capable of removing VOCs at their low concentrations.



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Figure 5-5
Alternative 3:
In-Situ Air Sparging Schematic
City of Helena Landfill
Helena, Montana

5.4 ALTERNATIVE 4 - EXTRACTION/DISCHARGE TO POTW FOR TREATMENT

This alternative includes groundwater monitoring, institutional controls, extraction of impacted groundwater, and treatment at the POTW.

5.4.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.701. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

5.4.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

5.4.3 Extraction

Under this alternative, contaminated groundwater would be collected using several groundwater extraction wells installed immediately downgradient of the landfill as indicated in Figure 5-6. Extraction wells would be placed along the railroad property just north of the landfill. Wells would be spaced so as to intercept all groundwater flowing from the apparent source area near EPA-1. Existing information indicate that flow rates of between 100 and 250 gpm would be required to fully intercept the groundwater plume. Placement of the extraction wells indicates that collected groundwater would contain approximately 20 µg/L or less of tetrachloroethene.

5.4.4 POTW Treatment

Extracted groundwater would then be discharged to the existing sanitary sewer for eventual treatment at the POTW (Figure 5-7). Present treatment processes at the Helena wastewater treatment plant involve biological and physical processes which are applicable for removal of VOCs at these low concentrations.



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Figure 5-6
 Alternative 4: Groundwater
 Extraction/Discharge to POTW

City of Helena Landfill
 Helena, Montana

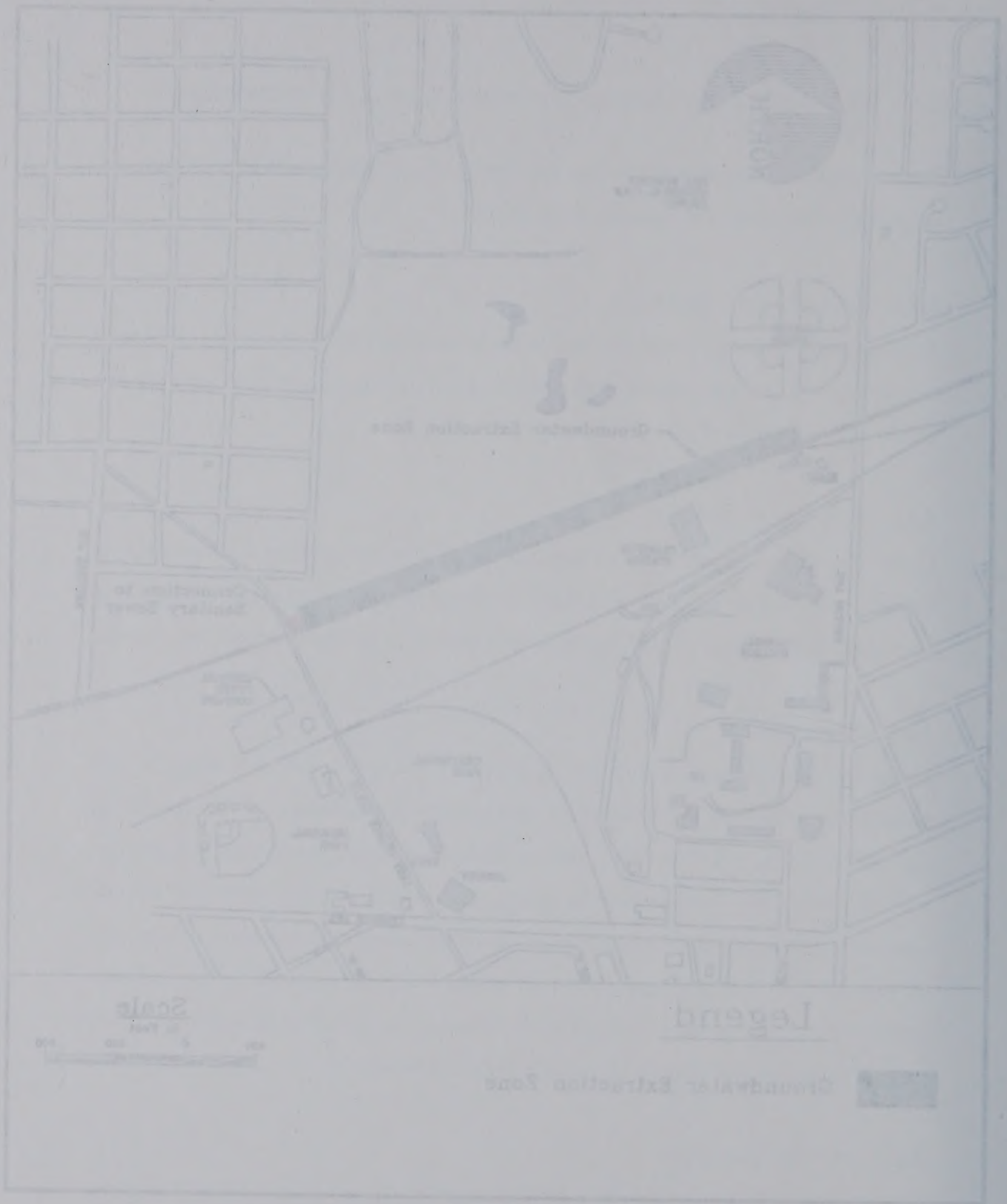
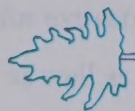
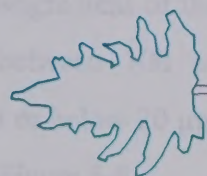


Figure 5-3
 Alternative 4: Groundwater
 Extraction/Discharge to POTW
 City of Helena Landfill
 Helena, Montana

Hydrometrix, Inc.
 Project No. 00000
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Equipment Shed



Extraction Well

To POTW for Treatment

Dissolved PCE

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 Dwg. No: 52895003
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 Rev. Date:

Figure 5-7
 Alternative 4:
 Extraction/Discharge Schematic
 City of Helena Landfill
 Helena, Montana

Hydrometrics, Inc.

1000 parts
100% 200%
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100% 100% 200% 200%
100% 100% 200% 200%

1000 parts
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100% 100% 200% 200%
100% 100% 200% 200%



5.5 ALTERNATIVE 5 - EXTRACTION/EVAPORATION/SEASONAL DISCHARGE TO POTW

Alternative 5 provides for extraction, evaporation of impacted groundwater, and seasonal treatment at the POTW as well as continued monitoring and institutional controls.

5.5.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.706. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards

5.5.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

5.5.3 Extraction

As with Alternative 4, this alternative would involve extraction of groundwater immediately downgradient of the landfill. Present information indicate that this system would extract between 100 and 250 gpm of groundwater with tetrachloroethene concentrations at or below 20 $\mu\text{g/L}$. Placement of extraction wells and discharge options are presented in Figure 5-8.

5.5.4 Evaporation/UV Destruction

Groundwater extracted under this alternative would be diverted to holding ponds for eventual use for spray irrigation of city-owned property at the Bill Roberts Golf Course. Figure 5-9 presents a schematic of this proposed alternative. Tetrachloroethene has a Henry's constant value of 1100. Constituents with a Henry's Constant of above 100 are readily strippable and easily volatilize during spray irrigation. Groundwater containing VOCs would receive additional treatment from exposure to UV energy while in the

2.2 ALTERNATIVE 2 - EXTRACTIVE VAPORATION/SEASONAL DISCHARGE TO POTW

Alternative 2 provides for extraction-vapouration of impacted groundwater and seasonal discharge to the POTW as well as continued monitoring and institutional controls.

2.2.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.706. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

2.2.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

2.2.3 Extraction

As with Alternative 1, this alternative would involve extraction of groundwater immediately downstream of the landfill. Present information indicates that this system would extract between 100 and 250 gpm of groundwater with concentrations of contaminants as low as 10 µg/L. Placement of extraction wells and discharge options are presented in Figure 2-6.

2.2.4 Extraction/UV Destruction

Groundwater extracted under this alternative would be directed to existing ponds for eventual use for spray irrigation of city-owned property at the Bill Roberts Golf Course. Figure 2-7 presents a schematic of this proposed alternative. Tetrachloroethene has a Henry's constant value of 1400. Compounds with a Henry's constant of above 100 are readily volatile and easily volatilized during spray irrigation. Groundwater containing VOCs would receive additional treatment from exposure to UV energy while in the

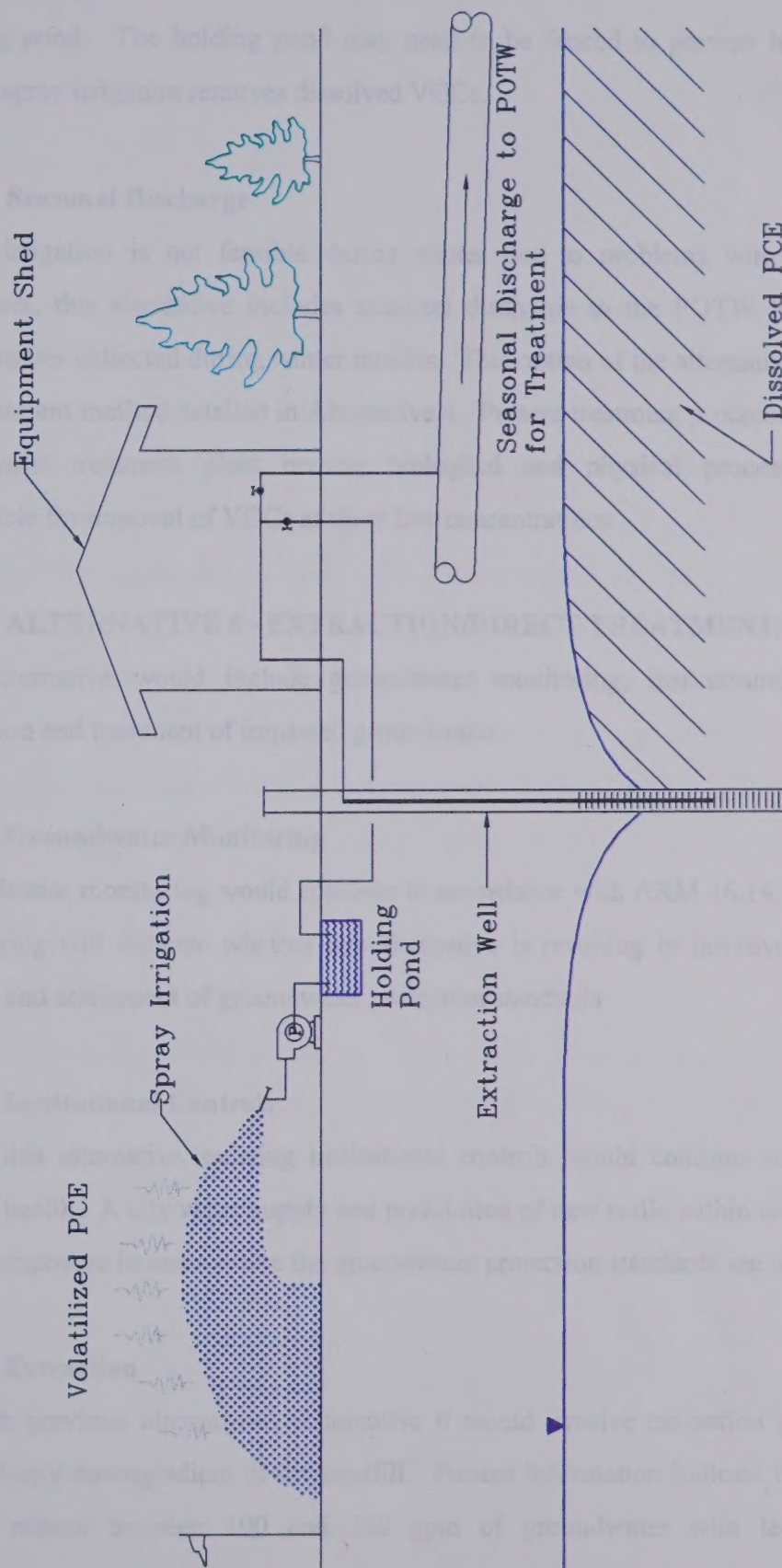


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Figure 5-8
*Alternative 5: Groundwater Extraction/
 Evaporation/Seasonal Discharge to POTW*
 City of Helena Landfill
 Helena, Montana





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Figure 5-9
 Alternative 5:
 Extraction/Evaporation Schematic
 City of Helena Landfill
 Helena, Montana

HydroAmerica, Inc.

Box 1000

Box 1000

Post Office Box 1000

Denver, CO 80202

Call No. 800-800-8000

Fax No. 303-733-7333

HydroAmerica, Inc.

Box 1000

Box 1000

Post Office Box 1000

Denver, CO 80202

Call No. 800-800-8000

Fax No. 303-733-7333



holding pond. The holding pond may need to be fenced to prevent human exposure before spray irrigation removes dissolved VOCs.

5.5.5 Seasonal Discharge

Spray irrigation is not feasible during winter due to problems with ice formation. Therefore, this alternative includes seasonal discharge to the POTW for treatment of groundwater collected during winter months. This option of the alternative is identical to the treatment method detailed in Alternative 4. Present treatment processes at the Helena wastewater treatment plant involve biological and physical processes which are applicable for removal of VOCs at these low concentrations.

5.6 ALTERNATIVE 6 - EXTRACTION/DIRECT TREATMENT/DISCHARGE

This alternative would include groundwater monitoring, institutional controls and extraction and treatment of impacted groundwater.

5.6.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARM 16.14.701. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards

5.6.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risks to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

5.6.3 Extraction

As with previous alternatives, Alternative 6 would involve extraction of groundwater immediately downgradient of the landfill. Present information indicate that this system would extract between 100 and 250 gpm of groundwater with tetrachloroethene

holding pond. The holding pond may need to be lined to prevent human exposure before any ingestion removes dissolved VOC's.

2.2.2 Groundwater Discharge

Groundwater discharge is not feasible during winter due to problems with the liner. Therefore, this alternative includes seasonal discharge to the POTW for treatment of groundwater collected during winter months. This option of the alternative is limited to the treatment method detailed in Alternative 4. Present treatment processes at the HHS wastewater treatment plant involve biological and physical processes which are applicable for removal of VOC's at these low concentrations.

2.2 ALTERNATIVE 4 - EXTRACT-AND-DIRECT TREATMENT-DISCHARGE

This alternative would include groundwater monitoring, institutional controls and extraction and treatment of impacted groundwater.

2.2.1 Groundwater Monitoring

Groundwater monitoring would continue in accordance with ARRI 10-14-701. Continued monitoring will indicate whether this alternative is resulting in improved groundwater quality and attainment of groundwater protection standards.

2.2.2 Institutional Controls

Under this alternative, existing institutional controls would continue to limit risk to human health. A city water supply and prohibition of new wells within city limits reduce human exposure in areas where the groundwater protection standards are not yet attained.

2.2.3 Extraction

As with previous alternatives, Alternative 5 would involve extraction of groundwater immediately downgradient of the landfill. Present information indicates that this system would extract between 100 and 150 gpm of groundwater with trichloroethylene

concentrations at or below 20 µg/L. Placement of extraction wells and discharge options are presented in Figure 5-10.

5.6.4 Direct Treatment

Groundwater extracted under this alternative would be treated on-site by a new water treatment facility with either an air stripping tower or granular activated carbon (GAC) canisters. Tetrachloroethene is readily volatilized during air stripping and is readily adsorbed in GAC canisters. Determination of the precise treatment option would be based on further analysis of groundwater flow near the landfill and system design. Air stripping is effective at removing high concentrations of dissolved VOC at relatively high flow rates but has significant capital costs. Treatment by adsorption in GAC canisters is effective for the very low concentrations present at the site but becomes prohibitive when large flow rates are required. Existing information indicate that flow rates of between 100 and 250 gpm would be required to fully intercept the groundwater plume. Either treatment option requires regular operation and maintenance. The treatment facility would consist of a heated, winterized building with an air stripper or GAC canisters (Figure 5-11).

5.6.5 Discharge

After treatment, groundwater would be discharged to one of two locations: 1) holding ponds for use as golf course irrigation, or 2) an infiltration gallery constructed downgradient of the treatment facility. Because groundwater contains very low concentrations of VOCs, treatment by either air stripping or GAC adsorption would likely result in an effluent with undetectable levels of tetrachloroethene.

concentrations are below 10 µg/L. Placement of extraction wells and discharge systems are presented in Figure 2-10.

2.4.4. Groundwater Treatment

Groundwater extracted under this alternative would be treated on-site by a new water treatment facility with either an air stripping tower or granular activated carbon (GAC) system. Treated groundwater is readily volatilized during air stripping and is readily extracted in GAC systems. Determination of the precise treatment option would be based on further analysis of groundwater flow near the landfill and system design. Air stripping is effective at removing high concentrations of dissolved VOC at relatively high flow rates but has significant capital costs. Treatment by adsorption in GAC systems is effective for the very low concentrations present at the site but becomes prohibitive when large flow rates are required. Existing information indicates that flow rates of between 100 and 150 gpm would be required to fully intercept the groundwater plume. Either treatment option requires regular operation and maintenance. The treatment facility would consist of a treated, vented building with an air stripper or GAC canister.

(Figure 2-11)

2.4.5. Discharge

After treatment, groundwater would be discharged to one of two locations: (1) holding ponds for use as golf course irrigation or (2) an infiltration gallery constructed downgradient of the treatment facility. Because groundwater contains very low concentrations of VOC, treatment by either air stripping or GAC adsorption would likely result in effluent with undetectable levels of trichloroethene.



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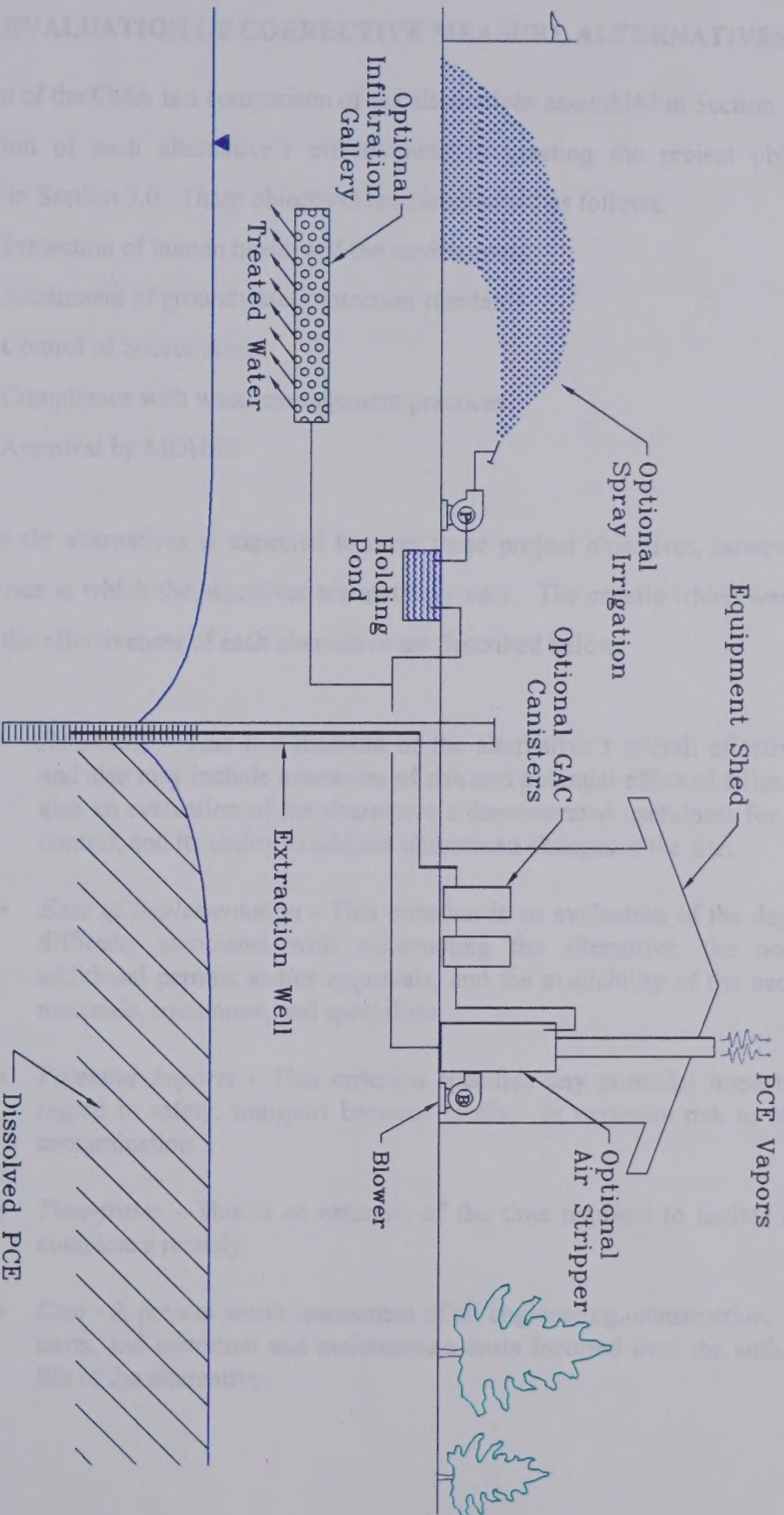
Hydrometrics, Inc.

Figure 5-10
Alternative 6:
Groundwater Extraction/Direct Treatment
 City of Helena Landfill
 Helena, Montana



Figure 5-10
 Alternative 5
 Groundwater Extraction/Direct Treatment
 City of Baton Rouge
 Water Management

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6.0 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

This section of the CMA is a comparison of the alternatives assembled in Section 5.0 and an evaluation of each alternative's effectiveness in meeting the project objectives established in Section 3.0. These objectives are summarized as follows:

- Protection of human health and the environment
- Attainment of groundwater protection standards
- Control of Source Area
- Compliance with waste management practices
- Approval by MDHES

Each of the six alternatives is expected to meet these project objectives, however, the degree and rate at which the objectives are met may vary. The criteria which were used to evaluate the effectiveness of each alternative are described below.

- *Reliability* - This is a measure of the alternative's overall effectiveness, and also may include a measure of risk and potential effect of failure. It is also an evaluation of the alternative's demonstrated usefulness for source control, and its ability to address unforeseen changes at the site.
- *Ease of Implementation* - This criterion is an evaluation of the degree of difficulty associated with constructing the alternative, the need for additional permits and/or approvals, and the availability of the necessary materials, equipment, and specialists.
- *Potential Impacts* - This criterion specifies any potential impacts with regard to safety, transport between media, or exposure risk to residual contamination.
- *Time-frame* - This is an estimate of the time required to initiate and to complete a remedy.
- *Cost* - A present worth assessment of all engineering, construction, capital costs, and operation and maintenance costs incurred over the anticipated life of the alternative.

AN EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

This section of the CMA is a comparison of the alternatives presented in Section 2.0 and an evaluation of each alternative's effectiveness in meeting the project objectives established in Section 3.0. These objectives are summarized as follows:

- Protection of human health and the environment
- Attainment of groundwater protection standards
- Control of Source Area
- Compliance with waste management practices
- Approval by MCHES

Each of the six alternatives is expected to meet these project objectives; however, the degree and rate at which the objectives are met may vary. The criteria which were used to evaluate the effectiveness of each alternative are described below.

Effectiveness - This is a measure of the alternative's overall effectiveness, and also may include a measure of the rate and potential effect of failure. It is also an evaluation of the alternative's demonstrated capability for source control, and its ability to achieve watershed changes in the site.

Rate of Implementation - This criterion is an evaluation of the degree of difficulty associated with constructing the alternative, the need for additional permits and/or approvals, and the availability of the necessary materials, equipment and personnel.

Potential Impact - This criterion specifies any potential impacts with regard to safety, transport between media, or exposure risk to residues contained.

Time Frame - This is an estimate of the time required to initiate and to complete a remedy.

Cost - A present worth assessment of all engineering, construction, capital, and operation and maintenance costs incurred over the anticipated life of the alternative.

In addition to these criteria, two modifying criteria were considered as per ARM 14.16.708:

- Technical and economic capability of the owner
- Degree to which the alternative addresses community concerns

These modifying criteria allow alternatives which are considered favorable according to the primary evaluation, to be evaluated and selected according to the modifying criteria.

6.1 ALTERNATIVE 1: EXISTING CORRECTIVE MEASURES

Existing corrective measures which have already been implemented by the City include:

- Closure of the landfill (building transfer station)
- Clay capping on newest landfill area
- Extending the storm drain north of the landfill

Several institutional controls which are protective to human health also exist. These include the City's supply of drinking water to residents northwest of the landfill to Custer Avenue, a City ordinance which forbids the use of groundwater in the area as a potable source, and a ban on water well drilling within the city limits (Section 5.1.2).

6.1.1 Reliability

Several of the existing corrective measures have been implemented in the past 12 to 18 months and the effectiveness of these measures has not yet been evaluated. However, closure of the landfill is a significant means of controlling the source of contamination, and conditions are expected to improve with time. Because of the apparent extremely low risk which exists at the site, this alternative is considered to be reliable.

6.1.2 Ease of Implementation

This alternative has already been implemented and cannot be evaluated for this criterion.

6.1.3 Potential Impacts

No cross media contamination, or increased exposure or safety concerns are anticipated with this alternative.

6.1.4 Time-frame

This alternative has already been initiated and evaluation of its effectiveness will be achieved by continued groundwater monitoring as required by ARM 16.14.701. It is anticipated that improved conditions at the compliance boundary should be evident within 2 to 5 years. This time estimate is based on potential travel times from the apparent source area (near well EPA-1) to the relative compliance boundary near HL-90-1. Tetrachloroethene concentrations in EPA-1 have declined since 1992, and this decline may be evident at the compliance boundary within this time-frame.

6.1.5 Costs

The City of Helena (and its residents) have spent a substantial amount of money on the existing corrective measures. Closing the landfill, and other corrective measures, have cost the city \$557,000 to date.

In addition, the present worth cost of continued groundwater monitoring and evaluation of this alternative is expected to be approximately \$507,000 over a 30-year period (Table 6-1).

6.2 ALTERNATIVE 2: LANDFILL GAS EXTRACTION/ LANDFILL GAS FLARE

This alternative includes the installation of a network of landfill gas extraction wells and collecting and burning landfill gas. This process is described in Section 5.2.

6.2.1 Reliability

Several studies of the effect of landfill gas extraction on water quality have been performed. These studies have demonstrated that significant improvement in water

6.1.3 Estimated Impact

No more media contamination or increased exposure or safety concerns are anticipated with this alternative.

6.1.4 Timeliness

The alternative has already been initiated and evaluation of its effectiveness will be reported by continued groundwater monitoring as required by ARM 10.14.701. It is anticipated that improved conditions at the compliance boundary should be evident within 2 to 3 years. This time estimate is based on historical travel times from the nearest source area (near Well ET-A-1) to the relative compliance boundary near HI-90-1. Testosterone concentrations in ET-A-1 have declined since 1992, and this decline may be evident at the compliance boundary within this time frame.

6.1.5 Cost

The City of Helena (and its residents) have spent a substantial amount of money on the existing corrective measures. Closing the landfill and other corrective measures have cost the city \$257,000 to date.

In addition, the present worth cost of continued groundwater monitoring and evaluation of this alternative is expected to be approximately \$257,000 over a 30-year period (Table 6-1).

6.1 ALTERNATIVE 2: LANDFILL GAS EXTRACTION/LANDFILL GAS

FLARE

This alternative includes the installation of a network of landfill gas extraction wells and collecting and burning landfill gas. This process is described in Section 2.1.

6.1.1 Reliability

Several studies of the effect of landfill gas extraction on water quality have been performed. These studies have demonstrated that significant improvement in water

TABLE 6-1
Cost Estimate for Alternative 1: Existing Corrective Action

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Future Capital Costs **	\$0	
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$0	\$33,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$0	
Contingency (20% of Direct Costs)	\$0	
Legal & Admin. (3% of Direct Costs)	\$0	
Insurance/Taxes (2% of Direct Costs)	\$0	
Subtotal:	\$0	\$0
Total Alternative Costs:		
Total Costs:	\$0	\$33,000
*Discount Factor:	1	15.372
Present Worth:	\$0	\$507,276

Total Present Worth: **\$507,276**

* Assumes 30 year design life and 5% annual interest.

** Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 4-1
Cost Estimates for Alternative 1: Existing Conveyance Action

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Future Capital Costs **	\$0	\$23,000
Groundwater Monitoring/Investigation	\$0	\$23,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$0	\$0
Contingency (20% of Direct Cost)	\$0	\$0
Legal & Admin. (10% of Direct Cost)	\$0	\$0
Insurance (5% of Direct Cost)	\$0	\$0
Subtotal	\$0	\$0
Total Alternative Costs		
Total Costs	\$0	\$23,000
* Discount Factor = 1.1		\$2,352
Present Worth	\$0	\$20,648

Total Present Worth: \$20,648

* Assumes 10 year design life and 5% annual interest.
 ** Capital costs do not include the cost for conveyance measures already in place at the site as they are not alternative specific. Costs associated with conveyance measures are identified in Section 4.1.

quality can be obtained by controlling the migration of landfill gas. This alternative has a good potential to meet the project objectives.

6.2.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for landfill gas control. Materials and equipment to implement this remedy are readily available, however, this remedy would require an air emissions permit from the Montana Department of Health and Environmental Sciences.

6.2.3 Potential Impacts

Exposure to landfill gases (including methane, and hydrogen sulfide) is a serious risk for construction personnel. Special safety considerations would be necessary if this remedy is selected.

6.2.4 Time-frame

This alternative could be implemented within one year of selection. Assuming that landfill gas is a major contributor to the VOC content in the groundwater, it would be expected that improved groundwater conditions would be apparent within two years and project objectives would be met in 7 to 10 years.

6.2.5 Costs

Table 6-2 shows the estimated present worth \$1,332,000 of this alternative assuming that the remedy is utilized for thirty years.

6.3 ALTERNATIVE 3: IN-SITU AIR SPARGING

This alternative includes the installation of a network of air sparging wells just north of the landfilled areas, and is described in Section 5.3.

could be obtained by controlling the migration of landfill gas. This alternative has a good potential to meet the project objectives.

6.1.1. Use of Landfills

This technology has a demonstrated implementability and has been used extensively for landfill gas recovery. Materials and equipment to implement this remedy are readily available however, the remedy would require an on-site gas permit from the Minnesota Department of Health and Environmental Sciences.

6.1.2. Landfill Gas

Exposure to landfill gas (including methane, and hydrogen sulfide) is a serious risk to construction personnel. Special safety considerations would be necessary if this remedy is selected.

6.1.3. Time Frame

This alternative could be implemented within one year of selection. Assuming that landfill gas is a major component to the VOC content in the groundwater, it would be expected that improved groundwater conditions would be apparent within two years and project objectives would be met in 5 to 10 years.

6.1.4. Costs

Table 6-2 shows the estimated present worth \$1,133,000 of this alternative assuming that the remedy is utilized for thirty years.

6.2. ALTERNATIVE 2: IN-SITU AIR STRIPPING

This alternative involves the installation of a network of air sparging wells just south of the landfill area and is described in Section 2.3.

TABLE 6-2
Cost Estimate for Alternative 2: Landfill Gas Extraction and Treatment

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Extraction System	\$156,000	
Installation of Vapor Treatment Flare	\$60,000	
Operation and Maintenance		\$34,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$216,000	\$67,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$32,400	
Contingency (20% of Direct Costs)	\$43,200	
Legal & Admin. (3% of Direct Costs)	\$6,480	
Insurance/Taxes (2% of Direct Costs)	\$4,320	
Subtotal:	\$86,400	\$0
Total Alternative Costs:		
Total Costs:	\$302,400	\$67,000
*Discount Factor:	1	15.372
Present Worth:	\$302,400	\$1,029,924

Total Present Worth: **\$1,332,324**

* Assumes 30 year design life and 5% annual interest.

Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 6-1
Cost Estimate for Alternative II: Landfill Gas Extraction and Treatment

Description	Cost	
	Capital	Annual
Direct Costs		
Installation of Extraction System	\$1,060,000	
Installation of Vapor Treatment Unit	260,000	
Operation and Maintenance		\$24,000
Groundwater Monitoring Station		\$22,000
Subtotal:	\$1,320,000	\$26,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$159,000	
Contingency (5% of Direct Cost)	\$66,000	
Legal & Admin. (7% of Direct Cost)	\$92,400	
Insurance (2% of Direct Cost)	\$26,400	
Subtotal:	\$343,800	\$0
Total Alternative Costs:	\$1,663,800	\$26,000
Total Costs:	\$1,663,800	\$26,000
* Discount Factor:	1	12.73
Present Worth:	\$1,663,800	\$1,012,914

Total Present Worth: \$1,012,914

As shown in the design life and 20-year interest...
 Capital costs are not included in the cost for alternative because they are represented in the life cycle...
 even the alternative could be directly compared. Costs associated with existing alternative measures...
 are described in Section 6.1.

6.3.1 Reliability

Air-sparging is a commonly used technology for removing volatile constituents from groundwater. Tetrachloroethene has a Henry's constant value (measure of the strippability of a constituent) of 1100. Constituents with a Henry's Constant of above 100 are readily strippable and considered candidates for air sparging. This remedy would be effective in controlling downgradient concentrations of VOCs in groundwater but will not effectively reduce or control the source area.

6.3.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for remediation of petroleum spills. Materials and equipment to implement this remedy are readily available. This remedy may require vapor extraction and an air emissions permit from the Montana Department of Health and Environmental Sciences.

6.3.3 Potential Impacts

Potential impacts of this alternative include a potential for exposure of people to volatilized constituents in the air. In addition, this remedy may potentially mobilize or generate other constituents more toxic than the VOCs which already exist.

6.3.4 Time-frame

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

6.3.5 Costs

Table 6-3 shows the estimated present worth of this alternative is \$910,000 assuming that the remedy is utilized for 30 years.

6.2.1 Reliability

Air stripping is a commonly used technology for removing volatile constituents from groundwater. Tetrachloroethene has a Henry's constant value (measure of the volatility of a compound) of 1100. Compounds with a Henry's Constant of above 100 are readily stripable and considered candidates for air stripping. This remedy would be effective in controlling groundwater concentrations of VOCs in groundwater but will not effectively reduce or control the source area.

6.2.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for remediation of petroleum spills. Materials and equipment to implement this remedy are readily available. This remedy may require vapor extraction and an emission permit from the Federal Department of Health and Environmental Protection.

6.2.3 Potential Impacts

Potential impacts of this alternative include a potential for exposure of people to volatilized constituents in the air. In addition, this remedy may potentially mobilize or generate other constituents more toxic than the VOCs which already exist.

6.2.4 Time Frame

This alternative could be implemented within one year of initiation. Because of the alternative's proximity to the relative compliance boundary, an investment in water quality at the compliance wells would likely be needed within the first year or two. The completion date for this remedy would be the same as for Alternative 1 because no additional agency approval is required.

6.2.5 Cost

Table 6-2 shows the estimated present worth of this alternative is \$200,000 assuming that the remedy is initiated for 50 years.

TABLE 6-3
Cost Estimate for Alternative 3: In-Situ Air Sparging

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Air Sparging System	\$90,000	
Operation and Maintenance		\$18,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$90,000	\$51,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$13,500	
Contingency (20% of Direct Costs)	\$18,000	
Legal & Admin. (3% of Direct Costs)	\$2,700	
Insurance/Taxes (2% of Direct Costs)	\$1,800	
Subtotal:	\$36,000	\$0
Total Alternative Costs:		
Total Costs:	\$126,000	\$51,000
*Discount Factor:	1	15.372
Present Worth:	\$126,000	\$783,972

Total Present Worth: **\$909,972**

* Assumes 30 year design life and 5% annual interest.

Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

This cost estimate does not include costs for the optional vapor extraction system.

TABLE 4-3
Cost Estimate for Alternative 3: In-Situ Air Sparging

Description	Capital Costs	First Year Annual Costs
Direct Costs		
Installation of Air Sparging System	290,000	
Operation and Maintenance		218,000
Groundwater Monitoring Evaluation		233,000
Subtotal	290,000	221,000
Indirect Costs		
Engineering (15% of Direct Cost)		213,700
Contingency (20% of Direct Costs)		218,000
Legal & Admin. (3% of Direct Costs)		23,700
Insurance (2% of Direct Costs)		27,800
Subtotal	236,000	503,200
Total Alternative Costs		
Total Costs	526,000	521,000
Discount Factor		0.972
Present Worth	513,000	506,972

Total Present Worth: 506,972

* Assumes the first design bid and 50% annual interest.
 Capital cost does not include the cost for operating equipment already implemented by the city for the
 cost for all alternatives could be directly compared. Costs associated with existing corrective measures
 are described in Section 4.1.

This cost estimate does not include costs for the optional vapor extraction system.

6.4 ALTERNATIVE 4: GROUNDWATER EXTRACTION/ DISCHARGE TO POTW

This alternative includes the installation of a network of groundwater extraction wells to intercept the groundwater plume. The water will then be piped to the City's sanitary sewer for transport to the treatment plant on Custer Avenue. Section 5.4 describes this alternative.

6.4.1 Reliability

This alternative would result in improvement in groundwater quality at the compliance boundary within the first year or two, but will also result in a regional lowering in the water table. This remedy would be effective in controlling migration of contaminants downgradient of the compliance boundary but will not effectively reduce or control the source area.

6.4.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control, however, it has no desirable effects in the source area. This remedy will require an analysis of the POTW's ability to handle the quantity of water extracted, and its ability to effectively treat the water and maintain the discharge quality requirements of Montana Department of Health and Environmental Sciences.

6.4.3 Potential Impacts

The extraction of groundwater from the site and off-site treatment will result in a consumptive use of the water. This impact may have wide spread implications to downgradient water users, and water rights holders.

6.4.4 Time-frame

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The

6.1 ALTERNATIVE 4: GROUNDWATER EXTRACTION/ DISCHARGE TO POTW

This alternative involves the installation of a network of groundwater extraction wells to intercept the groundwater plume. The water will then be piped to the City's sanitary sewer treatment plant on Grant Avenue. Section 5.4 describes the alternative.

6.1.1 Reliability

The alternative would result in improvement in groundwater quality at the compliance boundary within the first year or two, but will also result in a regional lowering in the water table. This remedy would be effective in controlling migration of contaminants away from the compliance boundary, but will not effectively reduce in the long term the source area.

6.1.2 Ease of Implementation

This technology has a demonstrated applicability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control barrier. It has no detectable effect on the water table. This remedy will require an analysis of the POTW's ability to handle the quantity of water extracted and its ability to effectively treat the water and maintain the discharge quality requirements of Minnesota Department of Health and Environmental Science.

6.1.3 Potential Impacts

The extraction of groundwater from the site and off-site treatment will result in a decrease in the water table. This impact may have some potential implications for groundwater users of the water. This impact may have some potential implications for groundwater users of the water.

6.1.4 Timing

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The

completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

6.4.5 Costs

Table 6-4 shows the estimated present worth of this alternative is \$1,090,000 assuming that the remedy is utilized for 30 years.

6.5 ALTERNATIVE 5: GROUNDWATER EXTRACTION\EVAPORATION\ SEASONAL DISCHARGE TO POTW

This alternative includes the installation of a network of groundwater extraction wells to intercept the groundwater plume. During the irrigation season, the water will be used for irrigation of the golf course or the ball fields owned by the city. Irrigation will aerate the water and expose the VOCs to destructive UV energy. During the off-season the water will be piped to the City's sanitary sewer for transport to the treatment plant on Custer Avenue. Section 5.5 describes this alternative.

6.5.1 Reliability

This alternative would require substantial treatability testing to determine if the VOCs were effectively treated during the irrigation process. If successful, this remedy would achieve timely improvements in groundwater quality at the compliance boundary, but will also result in a regional lowering of the water table. This remedy would be effective in controlling migration of contaminants downgradient of the compliance boundary but will not effectively reduce or control the source area.

6.5.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control, however, it has no desirable effects in the source area. A treatability test of the effectiveness of irrigation for treating the VOC's would be necessary prior to

Completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

4.4.2 Costs

Table 4-4 shows the estimated present worth of this alternative is \$1,090,000 assuming that the remedy is initiated for 30 years.

4.5 ALTERNATIVE 2: GROUNDWATER EXTRACTION/RECHARGE/SEASONAL DISCHARGE TO POTW

This alternative includes the installation of a network of groundwater extraction wells to intercept the groundwater plume. During the irrigation season, the water will be used for irrigation of the golf course or the ball fields owned by the city. Irrigation will secure the water and expose the VOCs to destructive UV energy. During the off-season the water will be piped to the City's sanitary sewer for transport to the treatment plant on Center Avenue. Section 4.3 describes this alternative.

4.5.1 Feasibility

This alternative would require substantial feasibility testing to determine if the VOCs were effectively treated during the irrigation process. If successful, this remedy would achieve timely improvements in groundwater quality at the compliance boundary, but will also result in a regional lowering of the water table. This remedy would be effective in controlling migration of contaminants downgradient of the compliance boundary but will not effectively reduce or control the source area.

4.5.2 State of Implementation

This technology has a demonstrated implementability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control, however it has no desorbic effect in the source area. A feasibility test of the effectiveness of migration for treating the VOCs would be necessary prior to

TABLE 6-4
Cost Estimate for Alternative 4: Groundwater Extraction\Discharge to POTW

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Extraction Well System	\$123,000	
Install Pipeline/Connection to Sewer	\$30,000	
Operation and Maintenance		\$24,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$153,000	\$57,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$22,950	
Contingency (20% of Direct Costs)	\$30,600	
Legal & Admin. (3% of Direct Costs)	\$4,590	
Insurance/Taxes (2% of Direct Costs)	\$3,060	
Subtotal:	\$61,200	\$0
Total Alternative Costs:		
Total Costs:	\$214,200	\$57,000
*Discount Factor:	1	15.372
Present Worth:	\$214,200	\$876,204

Total Present Worth: **\$1,090,404**

* Assumes 30 year design life and 5% annual interest.

Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 4-1
Cost Estimate for Alternative 2: Groundwater Extraction/Discharge to POTW

Item	Quantity	Unit Cost	Total Cost	Notes
Groundwater Extraction/Discharge				
Extraction of Groundwater	1,000,000	\$0.15	\$150,000	1,000,000 gal. @ \$0.15/gal.
Discharge to POTW	1,000,000	\$0.15	\$150,000	1,000,000 gal. @ \$0.15/gal.
Subtotal			\$300,000	
Equipment & Materials				
Extraction Equipment	1	\$100,000	\$100,000	1 unit @ \$100,000
Discharge Equipment	1	\$100,000	\$100,000	1 unit @ \$100,000
Subtotal			\$200,000	
Construction				
Extraction System	1	\$100,000	\$100,000	1 system @ \$100,000
Discharge System	1	\$100,000	\$100,000	1 system @ \$100,000
Subtotal			\$200,000	
Professional Fees				
Engineering (10% of Direct Costs)			\$20,000	
Legal & Admin. (5% of Direct Costs)			\$10,000	
Subtotal			\$30,000	
Total Alternative Cost			\$750,000	

Estimated 10-year total cost for the proposed project is \$750,000. This estimate is based on the following assumptions:

- 1. The project will be completed within 10 years.
- 2. The project will be completed within 10 years.
- 3. The project will be completed within 10 years.
- 4. The project will be completed within 10 years.
- 5. The project will be completed within 10 years.

implementation. This remedy will also require an analysis of the POTW's ability to handle the quantity of water extracted, and its ability to effectively treat the water and maintain the discharge quality requirements of Montana Department of Health and Environmental Sciences.

6.5.3 Potential Impacts

The extraction of groundwater from the site and off-site treatment will result in a seasonal consumptive use of the water, although during the irrigation season some of the water will be restored by infiltration. This impact may have wide spread implications to downgradient water users, and water rights holders, although less than alternative 4.

6.5.4 Time-frame

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

6.5.5 Costs

Table 6-5 shows the estimated present worth of this alternative is \$1,064,000 assuming that the remedy is utilized for 30 years.

6.6 ALTERNATIVE 6: GROUNDWATER EXTRACTION\DIRECT TREATMENT\DISCHARGE

This alternative includes the installation of a network of groundwater extraction wells to intercept the groundwater plume. Collected water will be treated by granular activated carbon (GAC) or air-stripping. These two treatment technologies are considered to be best applicable technologies (BAT) for treatment of tetrachloroethene. Selection of the appropriate treatment technology would be based on an economic analysis during system

implementation. This remedy will also require an analysis of the POTW's ability to handle the quantity of water extracted, and its ability to effectively treat the water and maintain the discharge quality requirements of Minnesota Department of Health and Environmental Services.

6.2.3 Potential Impacts

The extraction of groundwater from the site and off-site treatment will result in a seasonal compensatory use of the water, although during the irrigation season some of the water will be returned by infiltration. This impact may have some potential implications to groundwater users, and water rights holders, although less than alternative A.

6.2.4 Time Frame

This alternative could be implemented within one year of selection. Because of the alternative's proximity to the relevant compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The completion time for this remedy would be the same as for Alternative A because no additional source control is achieved.

6.2.5 Cost

Table 6-2 shows the estimated present worth of this remedy is \$1,054,000 assuming that the remedy is initiated for 10 years.

6.6 ALTERNATIVE 6: GROUNDWATER EXTRACTION/DIRECT TREATMENT/DISCHARGE

This alternative includes the installation of a network of groundwater extraction wells to intercept the groundwater plume. Collected water will be treated by granular activated carbon (GAC) or air stripping. These two treatment technologies are considered to be best applicable technologies (BAT) for treatment of trichloroethene. Selection of the appropriate treatment technology would be based on an economic analysis during design.

TABLE 6-5
Cost Estimate for Alternative 5: Groundwater Extraction
\Evaporation\Seasonal Discharge to POTW

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Extraction Well System	\$123,000	
Install Pipeline/Connection to Sewer	\$30,000	
Install Pipeline for Irrigation	\$14,000	
Operation and Maintenance		\$21,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$167,000	\$54,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$25,050	
Contingency (20% of Direct Costs)	\$33,400	
Legal & Admin. (3% of Direct Costs)	\$5,010	
Insurance/Taxes (2% of Direct Costs)	\$3,340	
Subtotal:	\$66,800	\$0
Total Alternative Costs:		
Total Costs:	\$233,800	\$54,000
*Discount Factor:	1	15.372
Present Worth:	\$233,800	\$830,088

Total Present Worth: **\$1,063,888**

* Assumes 30 year design life and 5% annual interest.

** Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 4-2

Cost Estimate for Alternative B: Groundwater Extraction
 / Separation/Seasonal Discharge in POTW

Item	First Year	Annual
Capital Costs	Costs	Costs
Installation of Extraction Well System	\$122,000	
Initial Pumping/Connection to Sewer	\$30,000	
Initial Pipeline for Injection	\$14,000	
Operation and Maintenance	\$21,000	
Groundwater Monitoring/Investigation	\$22,000	
Subtotal	\$169,000	\$224,000
Industrial Costs		
Engineering (15% of Direct Costs)	\$25,350	
Contingency (20% of Direct Costs)	\$42,400	
Legal & Admin. (3% of Direct Costs)	\$6,600	
Insurance/Taxes (12% of Direct Costs)	\$27,240	
Subtotal	\$101,590	20
Total Alternative Costs	\$270,590	\$244,000
Project Worth	\$270,590	\$244,000
Discount Factor	1	12.32
Present Worth	\$270,590	\$244,000

Total Present Worth \$1,053,000

Assumes 10 year design life and 10% annual interest.
 Capital costs are based on the cost of the equipment and materials required for the project.
 Operating costs are based on the cost of electricity and other resources required for the project.
 The project is assumed to be completed in 1980.

design. Treated water would be used for irrigation or infiltrated as described in Section 5.6.

6.6.1 Reliability

This alternative would be effective in achieving the project objectives, except for source control. This technology is widely used and both GAC and air-stripping systems are reliable if properly maintained. This remedy would be effective in controlling migration of contaminants downgradient of the compliance boundary but will not effectively reduce or control the source area.

6.6.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control, however, it has no desirable effects in the source area. Equipment and expertise for implementing this remedy is readily available. Permitting would likely be required for reinjecting (infiltration gallery). A heated building may be necessary to enclose air stripping and/or GAC equipment during winter months.

6.6.3 Potential Impacts

No cross media contamination, or increased exposure or safety concerns are anticipated with this alternative.

6.6.4 Time-frame

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

design. Treated water would be used for irrigation or infiltration as described in Section 5.4.

5.4.1 Reliability

This alternative would be effective in achieving the project objectives, except for source control. The technology is widely used and both GAC and air stripping systems are reliable if properly maintained. This remedy would be effective in controlling migration of contaminants downstream of the compliance boundary but will not effectively reduce or control the source area.

5.4.2 Ease of Implementation

This technology has a demonstrated implementability and has been used extensively for controlling migration of contaminants. Pump and treat technology is effective as a hydraulic control, however, it has no desirable effects in the source area. Equipment and expertise for implementing this remedy is readily available. Permitting would likely be required for installing (installion failure). A heated building may be necessary to enclose air stripping and/or GAC equipment during winter months.

5.4.3 Potential Impacts

No cross media contamination or increased exposure or safety concerns are anticipated with this alternative.

5.4.4 Time Frame

This alternative could be implemented within one year of selection. Because of this alternative's proximity to the relative compliance boundary, an improvement in water quality at the compliance wells would likely be noticed within the first year or two. The completion time for this remedy would be the same as for Alternative 1 because no additional source control is achieved.

6.6.5 Costs

Tables 6-6 and 6-7 show the estimated present worth of this alternative ranges from \$1,300,000 to \$1,817,000 assuming that the remedy is utilized for 30 years.

6.7 COMPARISON OF ALTERNATIVES

Table 6-7 is a summary of the evaluation of the primary criteria for each of the six alternatives. All of the alternatives will meet, or potentially meet, the project objectives within a reasonable amount of time. Only Alternative 2 will significantly reduce the source of VOCs to groundwater, however, all of the other alternatives are protective of human health and the environment. The six alternatives can all be implemented with existing and readily available resources, however, Alternative 1 ranks highest in this category since it has already been implemented. Alternatives 4, 5 and 6 will allow for meeting the groundwater protection standard for tetrachloroethene at the compliance boundary within the shortest time frame, however, existing institutional controls on land and water usage in the plume area effectively protect human health, and a longer time-frame for meeting the GWPS could be acceptable. Because of the similar ranking of each of the alternatives, it is appropriate to apply the modifying criteria (community concerns and cost) for alternative selection. Alternative 1 is clearly the most cost effective remedy. Community concerns will have to be assessed during a public review period and public meeting. Due to several considerations (low risk, protective institutional controls, recently completed corrective measures, and high costs of other alternatives), Alternative 1 is considered by the city to be the most appropriate site remedy.

Table 6-6 and 6-7 show the estimated present worth of the alternative ranges from \$1,360,000 to \$1,815,000 assuming that the remedy is utilized for 30 years.

6.7 COMPARISON OF ALTERNATIVES

Table 6-7 is a summary of the evaluation of the primary criteria for each of the six alternatives. All of the alternatives will meet or possibly meet the project objectives within a reasonable amount of time. Only Alternative 2 will significantly reduce the amount of VOCs to groundwater, however, all of the other alternatives are protective of human health and the environment. The six alternatives can all be implemented with existing and readily available resources, however, Alternative 1 ranks highest in this category since it has already been implemented. Alternatives 4, 5 and 6 will allow for meeting the groundwater protection standard for human health at the compliance boundary within the shortest time frame, however, existing institutional controls on land use and zoning in the project area effectively protect human health and a longer time frame for meeting the GWTs could be acceptable. Because of the similar ranking of each of the alternatives, it is appropriate to apply the modifying criteria (community concerns and cost) for alternative selection. Alternative 1 is clearly the most cost effective remedy. Community concerns will have to be assessed during a public review period and public hearing. Due to technical considerations, low risk institutional controls, namely completed drainage basins, and high costs of other alternatives, Alternative 1 is considered by the city to be the most appropriate the

remedy.

TABLE 6-6
Cost Estimate for Alternative 6: Groundwater Extraction
\Direct Treatment\Discharge - Air Stripping Option

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Extraction Well System	\$133,000	
Installation of Air Stripper	\$40,000	
Install Pipeline for Irrigation/Infiltration	\$14,000	
Operation and Maintenance		\$34,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$187,000	\$67,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$28,050	
Contingency (20% of Direct Costs)	\$37,400	
Legal & Admin. (3% of Direct Costs)	\$5,610	
Insurance/Taxes (2% of Direct Costs)	\$3,740	
Subtotal:	\$74,800	\$0
Total Alternative Costs:		
Total Costs:	\$261,800	\$67,000
*Discount Factor:	1	15.372
Present Worth:	\$261,800	\$1,029,924

Total Present Worth: **\$1,291,724**

* Assumes 30 year design life and 5% annual interest.

Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 2-2
Cost Estimate for Alternative 6: Groundwater Extraction
Direct Treatment/Discharge - Air Stripping Option

Description	First Year Capital Costs	Annual Operating Costs
Groundwater Extraction Evaluation		
Operation and Maintenance		\$22,000
Installation of Extraction Well System	\$133,000	
Installation of Air Strippers	\$40,000	
Installation of Injection Distribution	\$14,000	
Subtotal	\$187,000	\$22,000
Indirect Costs		
Insurance/Taxes (2% of Direct Costs)	\$3,740	
Legal & Admin. (3% of Direct Costs)	\$5,010	
Contingency (5% of Direct Costs)	\$9,350	
Engineering (15% of Direct Costs)	\$28,050	
Subtotal	\$46,150	
Total	\$233,150	\$22,000

Total Alternative Costs:

Total Costs	\$233,150
Discount Factor	0.92
Present Worth - \$233,150 - 27,000/0.92	\$233,150

Total Present Worth: \$233,150

As shown in Table 2-2, the total cost for Alternative 6 is \$233,150. This cost includes the capital and operating costs for the extraction and air stripping system. The capital costs are \$187,000, and the annual operating costs are \$22,000. The present worth of these costs, discounted at 8%, is \$233,150. This cost is compared to the costs of the other alternatives in Table 2-1 to determine the most economical alternative.

TABLE 6-7
Cost Estimate for Alternative 6: Groundwater Extraction
\Direct Treatment\Discharge - GAC Adsorption Option

Description	First Year Capital Costs	Annual O&M Costs
Direct Costs		
Installation of Extraction Well System	\$133,000	
Installation of Parallel GAC System	\$80,000	
Install Pipeline for Irrigation/Infiltration	\$14,000	
Operation and Maintenance		\$64,000
Groundwater Monitoring/Evaluation		\$33,000
Subtotal:	\$227,000	\$97,000
Indirect Costs		
Engineering (15% of Direct Cost)	\$34,050	
Contingency (20% of Direct Costs)	\$45,400	
Legal & Admin. (3% of Direct Costs)	\$6,810	
Insurance/Taxes (2% of Direct Costs)	\$4,540	
Subtotal:	\$90,800	\$0
Total Alternative Costs:		
Total Costs:	\$317,800	\$97,000
*Discount Factor:	1	15.372
Present Worth:	\$317,800	\$1,491,084

Total Present Worth: **\$1,808,884**

* Assumes 30 year design life and 5% annual interest.

Capital cost does not include the cost for corrective measures already implemented by the city so that costs for all alternatives could be directly compared. Costs associated with existing corrective measures are described in Section 6.1.

TABLE 6-7
Cost Estimate for Alternative 4: Groundwater Extraction
Ground Treatment/Discharge - GAC Adsorption Option

Item	Unit	Quantity	Unit Cost	Total Cost
Groundwater Monitoring Evaluation				\$23,000
Operation and Maintenance				\$64,000
Install Pipelines for Injection/Extraction				\$14,000
Installation of Parallel GAC System				\$80,000
Installation of Extraction Well System				\$133,000
Subtotal:				\$297,000
Extraction Costs				
Extraction (75% of Direct Cost)				\$24,050
Conveyance (10% of Direct Cost)				\$4,400
Leak & Abuse (1% of Direct Cost)				\$1,410
Insurance (2% of Direct Cost)				\$2,940
Subtotal:				\$32,800
Total Alternative Costs:				\$329,800
Present Worth				\$214,800
Discount Factor				13.33
Level Cost				\$297,000
Total Present Worth:				\$214,800

Assumes 10-year design life and 7% annual interest.
Capital cost does not include the cost for construction materials already incorporated by the city in the
costs for the alternatives would be directly compared. Items associated with existing corrective measures
are described in Section 6.1.

TABLE 6-8
EVALUATION OF ALTERNATIVES

Evaluation Criteria	Alternative 1 Existing Corrective Action	Alternative 2 Landfill Gas Extraction/ Landfill Gas Flare	Alternative 3 In-Situ Air Sparging	Alternative 4 Extraction/ Discharge to POTW for Treatment	Alternative 5 Extraction/ Evaporation/ Seasonal Treatment at POTW	Alternative 6 Extraction/ Direct Treatment/ Discharge
Reliability	⊙	⊙	⊙	●	⊙	●
Ease of Implementation	●	●	●	⊙	⊙	⊙
Potential Impacts	None	Construction safety concerns	Mobilization of other substances	Consumptive water use/VOC load on POTW	Consumptive water use/ exposure during spraying/ VOC load on POTW	None
Time Frames (years)	Implement - 0 Reach goals - 15 Monitor - 30	Implement - 1 Reach goals - 10 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30
Preliminary Total Present Worth	\$507,000	\$1,332,000	\$910,000	\$1,090,000	\$1,064,000	\$1,300,000 Air Stripping to \$1,817,000 GAC

POTW Publicly owned treatment works
GAC Granular activated carbon

- Meets criterion
- ⊙ Has potential to meet criterion
- Does not meet criterion



7.0 PREFERRED CORRECTIVE ALTERNATIVE

The preferred corrective measure chosen by the city must fulfill the requirements specified in ARM 16.14.708. These requirements are:

- Protection of Human Health and the Environment
- Attainment of Groundwater Protection Standards
- Control the Source of Releases
- Comply with Waste Management Standard

The preferred alternative identified in the screening process (Alternative 1) must be demonstrated to meet these requirements. This section describes the chosen alternative's ability to comply with these requirements.

7.1 PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

Section 2.5 describes the degree of risk to human health and the environment present at the landfill. Groundwater quality for all constituents monitored except tetrachloroethene are within compliance or already meet the cleanup requirements promulgated by MDHES, at the relative compliance boundary. Institutional controls already in place are protective of human health in the residential area northwest of the landfill. Because of a demonstrated additional source of tetrachloroethene south of this residential area, a more aggressive remedy would likely have little or no effect on potential risk to human health or the environment.

7.2 ATTAINMENT OF GROUNDWATER PROTECTION STANDARDS

Section 2.0 of this document demonstrates that water quality for all constituents detected in groundwater at the site meet the groundwater protection standards (GWPS) at the compliance boundary, except for tetrachloroethene. While tetrachloroethene is slightly above the GWPS (5 ppb) at the compliance boundary, it has been demonstrated that actual risk associated with the tetrachloroethene in the water is extremely low (well within the acceptable risk levels established by MDHES for parameters without MCL's).

7.0 PROPOSED CORRECTIVE ALTERNATIVE

The preferred corrective measure chosen by the city must fulfill the requirements

specified in ARM 16.1-708. These requirements are:

- Protection of Human Health and the Environment
- Attainment of Groundwater Protection Standards
- Control the Source of Pollution
- Consistency with Water Management Standards

The preferred alternative identified in the screening process (Alternative 1) must be demonstrated to meet these requirements. This section describes the chosen alternative's ability to comply with these requirements.

7.1 PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

Section 2.2 describes the degree of risk to human health and the environment present in the landfill. Groundwater quality for all constituents measured except trichloroethene are within compliance or already meet the cleanup requirements promulgated by MDHES at the relative compliance boundary. Institutional controls already in place are protective of human health in the residential area northwest of the landfill. Because of a demonstrated additional source of trichloroethene south of this residential area, a more aggressive remedy would likely have little or no effect on potential risk to human health in the environment.

7.2 ATTAINMENT OF GROUNDWATER PROTECTION STANDARDS

Section 2.2 of this document describes the water quality for all constituents detected in groundwater at the site meet the groundwater protection standards (GWPS) at the compliance boundary, except for trichloroethene. While trichloroethene is slightly above the GWPS (5 ppt) at the compliance boundary, it has been demonstrated that actual risk associated with the trichloroethene in the water is extremely low (well within the acceptable risk as established by MDHES for parameters without MCLs).

The corrective measures which have been implemented by the City will be protective during the time period in which the GWPs will be attained by natural processes. Furthermore, ARM 16.14.708(7)(e) states that the MDHES may determine that remediation of a release of Table 2 (ARM 16.14.706) constituents from a disposal unit is impractical:

(I) *The groundwater is additionally contaminated by substances that have originated from a source other than a disposal unit and those substances are present in concentrations such that cleanup of the release from the disposal unit would provide no significant reduction in risk to actual or potential receptors; or*

(ii) *The constituent(s) is present in groundwater that :*

(A) *Is not currently or reasonably expected to be a source of drinking water; and*

(B) *Is not hydraulically connected with waters to which the hazardous constituents are migrating or are likely to migrate in a concentration(s) that would exceed the groundwater protection standards established...*

Because of the additional source of the tetrachloroethene to the area downgradient of the landfill, it is likely that more aggressive cleanup (past the existing corrective measures) will not significantly reduce risk to receptors. In addition, institutional controls already established designate that the groundwater most highly impacted is not and cannot be used as a source of drinking water, and at no time has the tetrachloroethene been detected in a source of drinking water at levels greater than the groundwater protection standard.

7.3 CONTROL OF SOURCE AREA

ARM 16.14.708(7)(b)(iii) states that the remedy must:

Control the source(s) of releases as to reduce or eliminate, to the maximum extent practicable, further releases of Table 2 (ARM 16.14.706) constituents into the environment that may pose a threat to human health or the environment.

Closure of the landfill has ensured that the source area will not be enlarged, and further releases that pose a threat to human health or the environment are not anticipated. Because of the extremely low risk level associated with present conditions of the landfill, further source control would not be practicable. Capping landfilled areas (according to the Montana regulations for the time period in which each landfilled area was capped) also serves to control the source.

7.4 COMPLIANCE WITH WASTE MANAGEMENT STANDARDS

ARM 16.14.708(7)(b)(iv) states that the remedy will:

Comply with standards for management of wastes as specified in ARM 16.14.708(8).

These standards include requirements for monitoring and assessment of the alternative's effectiveness, and implementation of interim measures if the remedy is not found to be protective or effective. Groundwater monitoring will be ongoing as part of corrective measures Alternative 1. It is recommended that the existing corrective measures be assessed for protectiveness on an annual basis, and that overall effectiveness be evaluated in 3 to 5 years.

7.5 PUBLIC COMMENT

ARM 16.14.708(6)(d) states that the results of the CMA, and the preferred remedy identified in the CMA must be discussed in a public meeting with interested and affected

2.3 CONTROL OF SOURCE AREA

ARM 1614708(5)(b) states that the remedy must:

Control the quantity of releases or to reduce or eliminate the releases from the source area; and
provide for the control of releases of TCE (ARM 1614708(5)(b)) consistent with the
provisions that may pose a threat to human health or the environment.

Comments of the landfill has stated that the source area will not be enlarged and there
is no plan to place a threat to human health or the environment are not anticipated.
Because of the extremely low risk level associated with present conditions of the landfill,
further source control would not be practical. Capping landfilled areas (according to
the Montana regulations for the time period in which each landfilled area was capped)
also serves to control the source.

2.4 COMPLIANCE WITH WASTE MANAGEMENT STANDARDS

ARM 1614708(5)(c) states that the remedy will:

Comply with standards for management of wastes as specified in ARM
1614708(5)(c)

These standards include requirements for monitoring and assessment of the effectiveness
of the remedy, and implementation of interim measures if the remedy is not found to be
effective or effective. Groundwater monitoring will be ongoing as part of corrective
measures Alternative 1. It is recommended that the existing corrective measures be
assessed for effectiveness on an annual basis, and that ongoing effectiveness be evaluated
in 3 to 5 years.

2.5 PUBLIC COMMENT

ARM 1614708(5)(d) states that the results of the CMA, and the proposed remedy
identified in the CMA must be discussed in a public meeting with interested and affected

parties. This meeting will take place prior to final selection, MDHES approval and implementation of the corrective measure. As previously mentioned, the degree at which the chosen corrective measure addresses community concern can be used as a modifying criteria for alternative selection. The City of Helena believes that Alternative 1 fulfills the project objectives and will also address public concern.

period. This meeting will take place prior to final selection. MDHES approval and implementation of the corrective measure. As previously mentioned, the degree to which the chosen corrective measure addresses community concern can be used as a weighting criteria for alternative selection. The City of Helena believes that Alternative 1 fulfills the project objectives and will also address public concern.

8.0 REFERENCES

- EPA, 1994. Integrated Risk Information System (IRIS), computer database updated quarterly, search performed for the January 1, 1994 version.
- EPA, 1991. Health Effects Assessment Summary Tables, Annual FY-1991, EPA Office of Emergency and Remedial Response, NTIS No. PB91-921199, January, 1991.
- EPA, 1985. Health Effects Assessment Document for Tetrachloroethylene (Perchloroethylene), Final Report, EPA Office of Health and Environmental Assessment, EPA/600/8-82/005F, July 1985.
- Hydrometrics, 1991. Hydrogeological Investigation of the City of Helena Landfill.
- Hydrometrics, 1993. Helena Landfill Closure Plan.
- Hydrometrics, 1994. Helena Landfill Sampling and Analysis Plan.
- Montana Department of Health and Environmental Sciences, 1994. Water Quality Bureau Circular WQB 7.

10 REFERENCES

- EPA, 1994. Integrated Risk Information System (IRIS) computer database updated quarterly, search performed for the January 1, 1994 version.
- EPA, 1991. Health Effects Assessment Summary Tables, Annual FY-1991, EPA Office of Emergency and Response, NHEHS No. 700-91-1100, January, 1991.
- EPA, 1982. Health Effects Assessment Document for Tetrachloroethylene (Pentachlorocyclohexene), Final Report, EPA Office of Health and Environmental Assessment, EPA 600/4-82/005, July, 1982.
- Hydrogenation, 1991. Hydrogenation Investigation of the City of Helena Landfill.
- Hydrogenation, 1993. Helena Landfill Closure Plan.
- Hydrogenation, 1994. Helena Landfill Sampling and Analysis Plan.
- Montana Department of Health and Environmental Sciences, 1994. Water Quality Bureau Closure WQBT.

APPENDIX A

SUMMARY OF WATER QUALITY ANALYSES

Sample Type: Irrigation Well

SITE CODE	I-1	I-1	I-1
SAMPLE DATE	04/27/94	08/24/94	11/21/94
SAMPLE TIME	15:00	09:30	13:30
LAB	EL	EL	EL
LAB NUMBER	94-17317	94-40102	94-58166
SAMPLE NUMBER	HL-I1	HL-9408-104	HL-9411-109

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	92.22	102.51
PH (FLD)	8.72	8.87
SC (UMHOS/CM AT 25 C) (FLD)	235.0	198.0
WATER TEMPERATURE (C) (FLD)	12.1	9.3

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001
1,2-DIBROMOMETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001	<0.001
2-HEXANONE	<0.02	<0.02	<0.02
ACETONE	<0.05	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001
DICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001
O-XYLENE	<0.001	<0.001	<0.001
METHYL ETHYL KETONE		<0.02	
METHYL ETHYL KETONE	<0.02		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	0.002	<0.002	<0.002

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

1-1	1-1	1-1	1-1
1-2	1-2	1-2	1-2
1-3	1-3	1-3	1-3
1-4	1-4	1-4	1-4
1-5	1-5	1-5	1-5
1-6	1-6	1-6	1-6
1-7	1-7	1-7	1-7
1-8	1-8	1-8	1-8
1-9	1-9	1-9	1-9
1-10	1-10	1-10	1-10
1-11	1-11	1-11	1-11
1-12	1-12	1-12	1-12
1-13	1-13	1-13	1-13
1-14	1-14	1-14	1-14
1-15	1-15	1-15	1-15
1-16	1-16	1-16	1-16
1-17	1-17	1-17	1-17
1-18	1-18	1-18	1-18
1-19	1-19	1-19	1-19
1-20	1-20	1-20	1-20
1-21	1-21	1-21	1-21
1-22	1-22	1-22	1-22
1-23	1-23	1-23	1-23
1-24	1-24	1-24	1-24
1-25	1-25	1-25	1-25
1-26	1-26	1-26	1-26
1-27	1-27	1-27	1-27
1-28	1-28	1-28	1-28
1-29	1-29	1-29	1-29
1-30	1-30	1-30	1-30
1-31	1-31	1-31	1-31
1-32	1-32	1-32	1-32
1-33	1-33	1-33	1-33
1-34	1-34	1-34	1-34
1-35	1-35	1-35	1-35
1-36	1-36	1-36	1-36
1-37	1-37	1-37	1-37
1-38	1-38	1-38	1-38
1-39	1-39	1-39	1-39
1-40	1-40	1-40	1-40
1-41	1-41	1-41	1-41
1-42	1-42	1-42	1-42
1-43	1-43	1-43	1-43
1-44	1-44	1-44	1-44
1-45	1-45	1-45	1-45
1-46	1-46	1-46	1-46
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1-96	1-96	1-96	1-96
1-97	1-97	1-97	1-97
1-98	1-98	1-98	1-98
1-99	1-99	1-99	1-99
1-100	1-100	1-100	1-100

Sample Type: Irrigation Well

SITE CODE	I-1	I-1	I-1
SAMPLE DATE	04/27/94	08/24/94	11/21/94
SAMPLE TIME	15:00	09:30	13:30
LAB	EL	EL	EL
LAB NUMBER	94-17317	94-40102	94-58166
SAMPLE NUMBER	HL-I1	HL-9408-104	HL-9411-109

-- SEMI-VOLATILE EXTRACTABLES --

1,4-DICHLOROBENZENE	<0.001	<0.001	<0.001
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-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Irrigation Well

SITE CODE	I-2	I-2	I-2
SAMPLE DATE	04/21/94	08/25/94	11/21/94
SAMPLE TIME	08:00	09:15	13:40
LAB	EL	EL	HYDRO
LAB NUMBER	94-16831	94-40380	
REMARKS			NO SAMPLE
SAMPLE NUMBER	HLI2	HL-9408-114	HL-9411-110

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)		PUMPING	39.56
PH (FLD)		7.67	
SC (UMHOS/CM AT 25 C) (FLD)		63.0	
WATER TEMPERATURE (C) (FLD)		15.4	

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	0.0011
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	<0.001	0.043
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0018	<0.001
DICHLOROFLUOROMETHANE	0.0015	
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE		<0.02
METHYL ETHYL KETONE	<0.02	
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	0.0013	<0.001
TOLUENE	<0.001	0.0013
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Irrigation Well

	I-2	I-2	I-2
SITE CODE	I-2	I-2	I-2
SAMPLE DATE	04/21/94	08/25/94	11/21/94
SAMPLE TIME	08:00	09:15	13:40
LAB	EL	EL	HYDRO
LAB NUMBER	94-16831	94-40380	
REMARKS			NO SAMPLE
SAMPLE NUMBER	HLI2	HL-9408-114	HL-9411-110

-- SEMI-VOLATILE EXTRACTABLES --

TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002	
1,4-DICHLOROBENZENE	<0.001	<0.001	

-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001	
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

FINANCIAL STATEMENTS

1-1	1-1	1-1	1-1
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1-1	1-1	1-1	1-1
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Sample Type: Irrigation Well

SITE CODE	I-3	I-3	I-3	I-3
SAMPLE DATE	05/08/90	04/21/94	08/25/94	11/21/94
SAMPLE TIME	11:40	08:15	09:00	13:45
LAB	EL	EL	EL	HYDRO
LAB NUMBER	90-12196	94-16832	94-40379	
REMARKS				NO SAMPLE
SAMPLE NUMBER	HL-9005-116	HLI3	HL-9408-108	HL-9411-111

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)		PUMPING	34.25
PH (FLD)		7.3	
SC (UMHOS/CM AT 25 C) (FLD)		845.0	
WATER TEMPERATURE (C) (FLD)		10.4	

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.0026	<0.001	0.0017
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0017	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001		
1,2-DIBROMOETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001		
2-CHLOROTOLUENE	<0.001		
2-HEXANONE		<0.02	<0.02
4-CHLOROTOLUENE	<0.001		
ACETONE		<0.05	<0.05
ACRYLONITRILE		<0.02	<0.02
BENZENE	<0.0005	<0.001	<0.001
BROMOBENZENE	0.001		
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	0.0038	0.0026	0.0013
CHLOROMETHANE	0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	0.0011	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0052	0.003	0.0012
DICHLOROFUOROMETHANE		0.003	
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE		<0.001	<0.001
M-XYLENE	<0.001		
O-XYLENE	<0.001	<0.001	<0.001
P-XYLENE	<0.001		
METHYL ETHYL KETONE			<0.02
METHYL ETHYL KETONE		<0.02	
METHYL ISOBUTYL KETONE		<0.02	<0.02
METHYLENE CHLORIDE	0.0011	<0.001	0.0012
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.007	0.0042	0.0042
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0011	<0.001	<0.001
TRICHLOROFUOROMETHANE	<0.001	<0.001	0.0015

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Irrigation Well

SITE CODE	I-3	I-3	I-3	I-3
SAMPLE DATE	05/08/90	04/21/94	08/25/94	11/21/94
SAMPLE TIME	11:40	08:15	09:00	13:45
LAB	EL	EL	EL	HYDRO
LAB NUMBER	90-12196	94-16832	94-40379	
REMARKS				NO SAMPLE
SAMPLE NUMBER	HL-9005-116	HLI3	HL-9408-108	HL-9411-111

-- VOLATILE ORGANICS --

VINYL ACETATE		<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROENZENE	<0.001		
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2,4-TRICHLOROENZENE	<0.001		
1,2,4-TRIMETHYLBENZENE	<0.001		
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DICHLOROENZENE	<0.001	<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001		
1,3-DICHLOROENZENE	<0.001		
1,3-DICHLOROPROPANE	<0.001		
TRANS-1,4-DICHLORO-2-BUTENE		<0.002	<0.002
1,4-DICHLOROENZENE	<0.0005	<0.001	<0.001
DICHLOROMONOFUOROMETHANE	0.0039		
HEXACHLOROBUTADIENE	<0.001		
ISOPROPYLBENZENE	<0.001		
N-BUTYLBENZENE	<0.001		
N-PROPYLBENZENE	<0.001		
NAPHTHALENE	<0.001		
P-ISOPROPYLTOLUENE	<0.001		
SEC-BUTYLBENZENE	<0.001		
TERT-BUTYLBENZENE	<0.001		

-- HYDROCARBONS --

M+P-XYLENE		<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Irrigation Well

SITE CODE	INF.GALLERY	INF.GALLERY	INF.GALLERY
SAMPLE DATE	04/21/94	08/25/94	11/21/94
SAMPLE TIME	08:40	10:00	09:15
LAB	EL	EL	EL
LAB NUMBER	94-16833	94-40381	94-58167
SAMPLE NUMBER	HL-IF1	HL-9408-113	HL-9411-112

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	11.24	6.33
PH (FLD)	7.45	7.57
SC (UMHOS/CM AT 25 C) (FLD)	584.0	509.0
WATER TEMPERATURE (C) (FLD)	13.4	8.9

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001	<0.001
2-HEXANONE	<0.02	<0.02	<0.02
ACETONE	<0.05	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001
DICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001
O-XYLENE	<0.001	<0.001	<0.001
METHYL ETHYL KETONE		<0.02	
METHYL ETHYL KETONE	<0.02		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002	<0.002

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Irrigation Well

SITE CODE	INF.GALLERY	INF.GALLERY	INF.GALLERY
SAMPLE DATE	04/21/94	08/25/94	11/21/94
SAMPLE TIME	08:40	10:00	09:15
LAB	EL	EL	EL
LAB NUMBER	94-16833	94-40381	94-58167
SAMPLE NUMBER	HL-IF1	HL-9408-113	HL-9411-112

-- SEMI-VOLATILE EXTRACTABLES --

1,4-DICHLOROBENZENE	<0.001	<0.001	<0.001
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-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE 82-2
 SAMPLE DATE 11/11/89
 SAMPLE TIME 17:15
 LAB EL
 LAB NUMBER 89-20181
 SAMPLE NUMBER HL-8911-002

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET) 14.81

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1. - Continued

1940	1941
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2240	2241
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2250	2251
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2256	2257
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Sample Type: Monitoring Wells

SITE CODE	82-2
SAMPLE DATE	11/11/89
SAMPLE TIME	17:15
LAB	EL
LAB NUMBER	89-20181
SAMPLE NUMBER	HL-8911-002

-- SEMI-VOLATILE EXTRACTABLES --

HEXACHLOROBUTADIENE	<0.001
ISOPROPYLBENZENE	<0.001
N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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Sample Type: Monitoring Wells

SITE CODE 82-3
SAMPLE DATE 11/13/89
SAMPLE TIME 11:45
LAB HYDRO
LAB NUMBER
SAMPLE NUMBER HL-8911-904

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET) 58.46

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Section 1.0 - Introduction

1.1.1. This document is a technical specification for the development of a new software system. It defines the requirements, architecture, and implementation details of the system. The system is designed to provide a secure and reliable environment for the processing of sensitive information.

1.1.2. The system is intended to be used by authorized personnel who have been trained in its operation. It is not to be used for any other purpose than the one specified in this document.

1.1.3. The system is subject to continuous monitoring and evaluation to ensure its effectiveness and security.

1.1.4. The system is to be developed in accordance with the standards and guidelines established by the relevant authorities.

1.1.5. The system is to be developed using the latest available technology and tools.

1.1.6. The system is to be developed in a modular fashion, allowing for the addition of new features and the replacement of existing ones.

1.1.7. The system is to be developed in a secure environment, with all development activities being subject to strict security controls.

1.1.8. The system is to be developed in a documented manner, with all development activities being recorded and reviewed.

1.1.9. The system is to be developed in a collaborative manner, with all development activities being subject to peer review.

1.1.10. The system is to be developed in a secure and reliable manner, with all development activities being subject to strict security controls.

1.1.11. The system is to be developed in a secure and reliable manner, with all development activities being subject to strict security controls.

1.1.12. The system is to be developed in a secure and reliable manner, with all development activities being subject to strict security controls.

1.1.13. The system is to be developed in a secure and reliable manner, with all development activities being subject to strict security controls.

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1.1.34. The system is to be developed in a secure and reliable manner, with all development activities being subject to strict security controls.

Sample Type: Monitoring Wells

SITE CODE	82-4	82-4
SAMPLE DATE	11/11/89	05/11/90
SAMPLE TIME	15:30	15:30
LAB	EL	EL
LAB NUMBER	89-20180	90-12199
SAMPLE NUMBER	HL-8911-001	HL-9005-122

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	59.05
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-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	0.01
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	0.0028
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBEZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	<0.001
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	0.069
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	0.0077
STYRENE	<0.001
TETRACHLOROETHENE	0.0049
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	0.0029
TRICHLOROFUOROMETHANE	0.042
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	
1,2,3-TRICHLOROPROPANE	<0.001	
1,2,4-TRICHLOROBENZENE	<0.001	<0.01
1,2,4-TRIMETHYLBENZENE	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	
1,2-DICHLOROBENZENE	<0.001	<0.01
1,3,5-TRIMETHYLBENZENE	<0.001	
1,3-DICHLOROBENZENE	<0.001	<0.01
1,3-DICHLOROPROPANE	<0.001	
1,4-DICHLOROBENZENE	<0.0005	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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10-1	10-1	10-1
10-2	10-2	10-2
10-3	10-3	10-3
10-4	10-4	10-4
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10-6	10-6	10-6

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Sample Type: Monitoring Wells

SITE CODE	82-4	82-4
SAMPLE DATE	11/11/89	05/11/90
SAMPLE TIME	15:30	15:30
LAB	EL	EL
LAB NUMBER	89-20180	90-12199
SAMPLE NUMBER	HL-8911-001	HL-9005-122

-- SEMI-VOLATILE EXTRACTABLES --

2-METHYL-4 6-DINITROPHENOL		<0.05
2,4,6-TRICHLOROPHENOL		<0.01
2,4-DICHLOROPHENOL		<0.01
2,4-DIMETHYLPHENOL		<0.01
2,4-DINITROPHENOL		<0.05
2,4-DINITROTOLUENE		<0.01
2,6-DINITROTOLUENE		<0.01
2-CHLORONAPHTHALENE		<0.01
2-CHLOROPHENOL		<0.01
2-NITROPHENOL		<0.01
3,3-DICHLOROBENZIDINE		<0.01
4-BROMOPHENYL PHENYL ETHER		<0.01
4-CHLORO-3-METHYLPHENOL		<0.01
4-CHLOROPHENYL PHENYL ETHER		<0.01
4-NITROPHENOL		<0.05
ACENAPHTHENE		<0.01
ACENAPHTHYLENE		<0.01
ANTHRACENE		<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)		<0.01
BENZIDINE		<0.01
BENZO (A) ANTHRACENE		<0.01
BENZO (A) PYRENE		<0.01
BENZO (B) FLUORANTHENE		<0.01
BENZO (GHI) PERYLENE		<0.01
BENZO (K) FLUORANTHENE		<0.01
BIS (2-CHLOROETHOXY) METHANE		<0.01
BIS (2-CHLOROETHYL) ETHER		<0.01
BIS (2-CHLOROISOPROPYL) ETHER		<0.01
BIS (2-ETHYLHEXYL) PHTHALATE		<0.01
BUTYL BENZYL PHTHALATE		<0.01
CHRYSENE		<0.01
DI-N-BUTYLPHTHALATE		<0.01
DI-N-OCTYLPHTHALATE		<0.01
DIBENZO (A,H) ANTHRACENE		<0.01
DICHLOROMONOFUOROMETHANE	0.031	
DIETHYLPHTHALATE		<0.01
DIMETHYLPHTHALATE		<0.01
FLUORANTHENE		<0.01
FLUORENE		<0.01
HEXACHLOROBENZENE		<0.01
HEXACHLOROBUTADIENE	<0.001	<0.01
HEXACHLOROETHANE		<0.01
INDENO (1,2,3-CD) PYRENE		<0.01
ISOPHORONE		<0.01
ISOPROPYLBENZENE	<0.001	
N-BUTYLBENZENE	<0.001	
N-NITROSO-DI-N-PROPYLAMINE		<0.01
N-NITROSOPHENYLAMINE		<0.01
N-PROPYLBENZENE	<0.001	
NAPHTHALENE	<0.001	<0.01
NITROBENZENE		<0.01
P-ISOPROPYLTOLUENE	<0.001	
PENTACHLOROPHENOL		<0.05
PHENANTHRENE		<0.01
PHENOL		<0.01
PYRENE		<0.01
SEC-BUTYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	82-4	82-4
SAMPLE DATE	11/11/89	05/11/90
SAMPLE TIME	15:30	15:30
LAB	EL	EL
LAB NUMBER	89-20180	90-12199
SAMPLE NUMBER	HL-8911-001	HL-9005-122

-- SEMI-VOLATILE EXTRACTABLES --

TERT-BUTYLBENZENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE 83-5
 SAMPLE DATE 11/13/89
 SAMPLE TIME 11:10
 LAB HYDRO
 LAB NUMBER
 SAMPLE NUMBER HL-8911-901

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET) 11.91

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6	83-6	83-6	83-6	83-6	83-6
SAMPLE DATE	11/13/89	04/05/91	01/31/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	11:00	14:00	09:45	16:30	12:00	13:00	09:30
LAB	HYDRO	EL	EL	EL	EL	EL	EL
LAB NUMBER		91-12769	92-5001	92-19274	92-49141	93-20284	93-59620
SAMPLE NUMBER	HL-8911-900	HL-9104-106	HL-9201-111	HL-9205-103	HL-9211-100	HL-9305-100	HL-9312-100
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	12.97	12.14	12.31	12.79	12.04	11.49	9.65
PH (FLD)				7.36	7.11	7.13	6.97
PH		7.5	7.8	7.6	7.4	7.2	7.3
SC (UMHOS/CM AT 25 C)			629.0	667.0	714.0	710.0	691.0
SC (UMHOS/CM AT 25 C) (FLD)				680.0	729.0	661.0	732.0
TDS (MEASURED AT 180 C)		511.0	421.0	425.0	463.0	459.0	
TOTAL SUSPENDED SOLIDS			420.0	10.0	1670.0	1490.0	
WATER TEMPERATURE (C) (FLD)			11.5	13.2	11.1	12.9	4.0
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS		114.0	89.0	94.0	94.0	96.0	
MAGNESIUM (MG) DIS		31.0	25.0	27.0	25.0	26.0	
SODIUM (NA) DIS		23.0	20.0	22.0	21.0	21.0	
POTASSIUM (K) DIS		5.0	3.0	4.0	4.0	3.0	
TOTAL ALKALINITY AS CaCO3		255.0	226.0	256.0	297.0	253.0	
BICARBONATE (HCO3)		311.0	276.0	313.0	362.0	309.0	
CARBONATE AS CO3		0.0	0.0	0.0	0.0	0.0	
SULFATE (SO4)		109.0	86.0	89.0	80.0	75.0	82.0
CHLORIDE (CL)		32.0	26.0	28.0	23.0	23.0	22.0
-- NUTRIENTS --							
AMMONIA (NH3 AS N)			<0.1	<0.1	<0.1	<0.1	
NITRATE (NO3-N)			4.27	4.02	3.82	3.76	4.65
NITRATE + NITRITE AS N		8.91					
TOTAL NITROGEN AS N		<0.1					
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) DIS							<0.05
ARSENIC (AS) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BARIUM (BA) DIS		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BERYLLIUM (BE) DIS							<0.001
CADMIUM (CD) DIS		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHROMIUM (CR) DIS		<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
COBALT (CO) DIS							<0.01
COPPER (CU) DIS							<0.01
IRON (FE) DIS		<0.03	0.09	0.1	<0.03	0.07	0.1
LEAD (PB) DIS		<0.01	<0.01	<0.01	0.02	<0.01	<0.01
MANGANESE (MN) DIS		0.04	0.05	<0.02	0.13	0.07	
MERCURY (HG) DIS		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NICKEL (NI) DIS							<0.01
SELENIUM (SE) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SILVER (AG) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
THALLIUM (TL) DIS							<0.1
VANADIUM (V) DIS							<0.1
ZINC (ZN) DIS							<0.01
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE							<0.001
1,1,1-TRICHLOROETHANE		0.0029	0.0017	0.0014	0.0012	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE		<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE							<0.001
1,2-DICHLOROETHANE		<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE							<0.001
2-BUTANONE (METHYL-ETHYL-KETONE)		<0.01					

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6	83-6	83-6	83-6	83-6	83-6
SAMPLE DATE	11/13/89	04/05/91	01/31/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	11:00	14:00	09:45	16:30	12:00	13:00	09:30
LAB	HYDRO	EL	EL	EL	EL	EL	EL
LAB NUMBER		91-12769	92-5001	92-19274	92-49141	93-20284	93-59620
SAMPLE NUMBER	HL-8911-900	HL-9104-106	HL-9201-111	HL-9205-103	HL-9211-100	HL-9305-100	HL-9312-100

-- VOLATILE ORGANICS --

2-CHLOROETHYL VINYL ETHER	<0.01	<0.01	<0.01	<0.001	<0.001	
2-HEXANONE	<0.01					<0.02
4-BROMOFLUOROBENZENE	0.01	<0.01	<0.01	<0.01	<0.01	
4-METHYL-2-PENTANONE	<0.01					
ACETONE	<0.01					<0.02
ACROLEIN	<0.01					
ACRYLONITRILE	<0.01					<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.01					<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0032	0.003	0.0012	0.0017	0.0027	0.0071
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE						<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHANOL	<0.01					
ETHYL METHACRYLATE	<0.01	<0.01	<0.01	<0.001	<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001	<0.001	<0.001	<0.001	
M-P XYLENE						<0.001
O-XYLENE						<0.001
METHYL ETHYL KETONE						<0.02
METHYL ISOBUTYL KETONE						<0.02
METHYLENE CHLORIDE	<0.001	0.0036	<0.001	<0.001	0.0012	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE						<0.001
1,2-DICHLOROBENZENE						<0.002
TRANS-1,4-DICHLORO-2-BUTENE						
1,4-DICHLORO-2-BUTENE	<0.01					<0.001
1,4-DICHLOROBENZENE						
1,4-DIFLUOROBENZENE	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
NAPHTHALENE						

-- HYDROCARBONS --

TOTAL ORGANIC CARBON	<2.0
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-- OTHER PARAMETERS --

CYANIDE (CN) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	0.007
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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6	83-6	83-6	83-6	83-6	83-6
SAMPLE DATE	11/13/89	04/05/91	01/31/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	11:00	14:00	09:45	16:30	12:00	13:00	09:30
LAB	HYDRO	EL	EL	EL	EL	EL	EL
LAB NUMBER		91-12769	92-5001	92-19274	92-49141	93-20284	93-59620
SAMPLE NUMBER	HL-8911-900	HL-9104-106	HL-9201-111	HL-9205-103	HL-9211-100	HL-9305-100	HL-9312-100

-- OTHER PARAMETERS --

CHEMICAL OXYGEN DEMAND		<1.0	<1.0	<1.0	10.0	<1.0	<1.0
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

STATE OF NEW YORK

1870	1871	1872	1873	1874	1875	1876	1877
12,221	16,171	10,171	17,021	20,171	18,171	17,171	17,171
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10

...

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6
SAMPLE DATE	04/07/94	11/18/94
SAMPLE TIME	18:20	12:00
LAB	EL	EL
LAB NUMBER	94-13571	94-58154
SAMPLE NUMBER	HL-9404-100	HL-9411-100

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	9.81	11.07
PH (FLD)	7.61	7.4
PH		7.2
SC (UMHOS/CM AT 25 C)		715.0
SC (UMHOS/CM AT 25 C) (FLD)	626.0	707.0
WATER TEMPERATURE (C) (FLD)	9.1	9.1

-- MAJOR CONSTITUENTS --

SULFATE (SO4)		88.0
CHLORIDE (CL)		22.0

-- NUTRIENTS --

NITRATE + NITRITE AS N		7.33
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05	<0.05
ARSENIC (AS) DIS	<0.005	<0.005
BARIUM (BA) DIS	<0.1	<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01
COBALT (CO) DIS	<0.01	<0.01
COPPER (CU) DIS	<0.01	<0.01
IRON (FE) DIS		0.09
LEAD (PB) DIS	<0.01	<0.01
MERCURY (HG) DIS	<0.001	<0.001
NICKEL (NI) DIS	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	<0.005
SILVER (AG) DIS	<0.005	<0.005
THALLIUM (TL) DIS	<0.1	<0.1
TIN (SN) DIS	<0.1	
VANADIUM (V) DIS	<0.1	<0.1
ZINC (ZN) DIS	0.03	<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYL CYANIDE	<0.02	
ALLYLCHLORIDE 3-CHLORO-1-PROPENE	<0.001	
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACROLEIN	<0.02	
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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100.00	100.00	100.00
99.99	99.99	99.99
99.98	99.98	99.98
99.97	99.97	99.97
99.96	99.96	99.96
99.95	99.95	99.95
99.94	99.94	99.94
99.93	99.93	99.93
99.92	99.92	99.92
99.91	99.91	99.91
99.90	99.90	99.90
99.89	99.89	99.89
99.88	99.88	99.88
99.87	99.87	99.87
99.86	99.86	99.86
99.85	99.85	99.85
99.84	99.84	99.84
99.83	99.83	99.83
99.82	99.82	99.82
99.81	99.81	99.81
99.80	99.80	99.80
99.79	99.79	99.79
99.78	99.78	99.78
99.77	99.77	99.77
99.76	99.76	99.76
99.75	99.75	99.75
99.74	99.74	99.74
99.73	99.73	99.73
99.72	99.72	99.72
99.71	99.71	99.71
99.70	99.70	99.70
99.69	99.69	99.69
99.68	99.68	99.68
99.67	99.67	99.67
99.66	99.66	99.66
99.65	99.65	99.65
99.64	99.64	99.64
99.63	99.63	99.63
99.62	99.62	99.62
99.61	99.61	99.61
99.60	99.60	99.60
99.59	99.59	99.59
99.58	99.58	99.58
99.57	99.57	99.57
99.56	99.56	99.56
99.55	99.55	99.55
99.54	99.54	99.54
99.53	99.53	99.53
99.52	99.52	99.52
99.51	99.51	99.51
99.50	99.50	99.50
99.49	99.49	99.49
99.48	99.48	99.48
99.47	99.47	99.47
99.46	99.46	99.46
99.45	99.45	99.45
99.44	99.44	99.44
99.43	99.43	99.43
99.42	99.42	99.42
99.41	99.41	99.41
99.40	99.40	99.40
99.39	99.39	99.39
99.38	99.38	99.38
99.37	99.37	99.37
99.36	99.36	99.36
99.35	99.35	99.35
99.34	99.34	99.34
99.33	99.33	99.33
99.32	99.32	99.32
99.31	99.31	99.31
99.30	99.30	99.30
99.29	99.29	99.29
99.28	99.28	99.28
99.27	99.27	99.27
99.26	99.26	99.26
99.25	99.25	99.25
99.24	99.24	99.24
99.23	99.23	99.23
99.22	99.22	99.22
99.21	99.21	99.21
99.20	99.20	99.20
99.19	99.19	99.19
99.18	99.18	99.18
99.17	99.17	99.17
99.16	99.16	99.16
99.15	99.15	99.15
99.14	99.14	99.14
99.13	99.13	99.13
99.12	99.12	99.12
99.11	99.11	99.11
99.10	99.10	99.10
99.09	99.09	99.09
99.08	99.08	99.08
99.07	99.07	99.07
99.06	99.06	99.06
99.05	99.05	99.05
99.04	99.04	99.04
99.03	99.03	99.03
99.02	99.02	99.02
99.01	99.01	99.01
99.00	99.00	99.00

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6
SAMPLE DATE	04/07/94	11/18/94
SAMPLE TIME	18:20	12:00
LAB	EL	EL
LAB NUMBER	94-13571	94-58154
SAMPLE NUMBER	HL-9404-100	HL-9411-100

-- VOLATILE ORGANICS --

CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROPROM	0.014	<0.001
CHLOROMETHANE	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE	<0.001	
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYL METHACRYLATE	<0.001	
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
ISOBUTANOL	<0.05	
O-XYLENE	<0.001	<0.001
METHACRYLONITRILE	<0.02	
METHYL ETHYL KETONE	<0.02	
METHYL ETHYL KETONE		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYL METHACRYLATE	<0.002	
METHYLENE CHLORIDE	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE	<0.02	
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001
PICLORAM	<0.0005	

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE	<0.00005	
1,4-BENZENEDIAMINE	ND	
CHLOROBENZILATE	<0.01	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4,5-TETRACHLOROETHENE	<0.01	
1,2,4-TRICHLOROETHENE	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROETHENE	<0.001	<0.001
1,3,5-TRINITROBENZENE	<0.01	
1,3-DICHLOROETHENE	<0.001	
1,3-DICHLOROPROPANE	<0.001	
1,3-DINITROBENZENE	<0.01	
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002
1,4-DICHLOROETHENE	<0.001	<0.001
METHAPYRILENE	ND	
1-METHYLNAPHTHALENE	<0.01	
1-NAPHTHYLAMINE	<0.01	
2,3,4,6-TETRACHLOROPHENOL	<0.01	
2,4,5-TRICHLOROPHENOL	<0.01	
2,4,6-TRICHLOROPHENOL	<0.01	
2,4-DICHLOROPHENOL	<0.01	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	83-6	83-6
SAMPLE DATE	04/07/94	11/18/94
SAMPLE TIME	18:20	12:00
LAB	EL	EL
LAB NUMBER	94-13571	94-58154
SAMPLE NUMBER	HL-9404-100	HL-9411-100

-- SEMI-VOLATILE EXTRACTABLES --

2,4-DIMETHYLPHENOL	<0.01
2,4-DINITROPHENOL	<0.05
2,4-DINITROTOLUENE	<0.01
2,6-DICHLOROPHENOL	<0.01
2,6-DINITROTOLUENE	<0.01
2-CHLORONAPHTHALENE	<0.01
2-CHLOROPHENOL	<0.01
2-METHYLNAPHTHALENE	<0.01
2-METHYLPHENOL (O-CRESOL)	<0.01
2-NAPHTHYLAMINE	<0.01
2-NITROANILINE	<0.01
2-NITROPHENOL	<0.01
2-PICOLINE	<0.01
3,3-DICHLOROBENZIDINE	<0.02
3-METHYLCHOLANTHRENE	<0.1
3-NITROANILINE	<0.01
4,6-DINITRO-2-METHYLPHENOL	<0.05
4-AMINOBIIPHENYL	<0.01
4-BROMOPHENYL PHENYL ETHER	<0.01
4-CHLORO-3-METHYLPHENOL	<0.01
4-CHLORO-2-METHYLPHENOL	<0.01
4-CHLOROPHENOL	<0.01
4-CHLOROPHENYL PHENYL ETHER	<0.01
4-METHYLPHENOL/3-METHYLPHENOL	<0.01
4-NITROANILINE	<0.01
4-NITROPHENOL	<0.0005
1,2-DIMETHYLBENZENE (A) ANTHRACENE	<0.01
A,A-DIMETHYLPHENETHYLAMINE	ND
ACENAPHTHENE	<0.01
ACENAPHTHYLENE	<0.01
ACETOPHENONE	<0.01
ANILINE	<0.01
ANTHRACENE	<0.01
ARAMITE	<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	<0.01
BENZIDINE	<0.02
BENZO (A) ANTHRACENE	<0.01
BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DINOSEB	<0.001
DIPHENYLAMINE	<0.01

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Sample Type: Monitoring Wells

SITE CODE	83-6	83-6
SAMPLE DATE	04/07/94	11/18/94
SAMPLE TIME	18:20	12:00
LAB	EL	EL
LAB NUMBER	94-13571	94-58154
SAMPLE NUMBER	HL-9404-100	HL-9411-100

-- SEMI-VOLATILE EXTRACTABLES --

ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHROPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1
PARATHION	<0.01
PENTACHLOROBENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.00005
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIONAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001
M+P-XYLENE	<0.001
ACIFLOURFEN	<0.0005
BENTAZON	<0.0025
CHLORAMBEN	<0.0005
DACTHAL	<0.001
DALAPON	<0.01
DICAMEA	<0.00025
DICHLORPROP	<0.001

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Sample Type: Monitoring Wells

SITE CODE	83-6	83-6
SAMPLE DATE	04/07/94	11/18/94
SAMPLE TIME	18:20	12:00
LAB	EL	EL
LAB NUMBER	94-13571	94-58154
SAMPLE NUMBER	HL-9404-100	HL-9411-100

-- HYDROCARBONS --

AROCLOR 1016	<0.001
AROCLOR 1221	<0.002
AROCLOR 1232	<0.001
AROCLOR 1242	<0.001
AROCLOR 1248	<0.001
AROCLOR 1254	<0.001
AROCLOR 1260	<0.001
AROCLOR 1262	<0.001
AROCLOR 1268	<0.001
2,4-D	<0.001
2,4-DB	<0.0025
DIALATE (AVADEX)	<0.01
3,5-DICHLOROBEZOIC ACID	<0.0005
DIMETHOATE (CYGON)	<0.1
DISULFOTON	<0.01
MCPA	<0.2
MCPP	<0.2
METHYL PARATHION (PENNCAP-M)	<0.01
PHORATE (THIMET)	<0.01
SULFOTEP	<0.01
2,4,5-T	<0.0002
2,4,5-TP (SILVEX)	<0.0002

-- OTHER PARAMETERS --

4,4'-DDD	<0.0001
4,4'-DDE	<0.0001
4,4'-DDT	<0.0001
ALDRIN	<0.00005
ALPHA-BHC	<0.00005
BETA-BHC	<0.00005
GAMMA-CHLORDANE	<0.00005
CYANIDE (CN) TOT	<0.005
DELTA-BHC	<0.00005
DIELDRIN	<0.0001
ENDOSULFAN I	<0.00005
ENDOSULFAN II	<0.0001
ENDOSULFAN SULFATE	<0.0001
ENDRIN	<0.0001
ENDRIN ALDEHYDE	<0.0001
ENDRIN KETONE	<0.0001
GAMMA-BHC (LINDANE)	<0.00005
HEPTACHLOR	<0.00005
HEPTACHLOR EPOXIDE	<0.00005
METHOXYCHLOR	<0.0005
PRONAMIDE	<0.01
SULFIDE AS S	<0.04
CHEMICAL OXYGEN DEMAND	2.0
TOXAPHENE	<0.005

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Sample Type: Monitoring Wells

SITE CODE	83-7	83-7
SAMPLE DATE	11/11/89	11/21/94
SAMPLE TIME	18:35	11:10
LAB	EL	HYDRO
LAB NUMBER	89-20183	
REMARKS		NO SAMPLE
SAMPLE NUMBER	HL-8911-004	HL-9411-101

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	33.7	DRY
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-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBEZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	<0.001
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	0.0044
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.0005
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.0005
TRICHLOROFLUOROMETHANE	<0.001
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBEZENE	<0.001
1,2,3-TRICHLOROPROPANE	<0.001
1,2,4-TRICHLOROBEZENE	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBEZENE	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001
1,3-DICHLOROBEZENE	<0.001
1,3-DICHLOROPROPANE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Sample Type: Monitoring Wells

SITE CODE	83-7	83-7
SAMPLE DATE	11/11/89	11/21/94
SAMPLE TIME	18:35	11:10
LAB	EL	HYDRO
LAB NUMBER	89-20183	
REMARKS		NO SAMPLE
SAMPLE NUMBER	HL-8911-004	HL-9411-101

-- SEMI-VOLATILE EXTRACTABLES --

1,4-DICHLOROBENZENE	<0.0005
DICHLOROMONOFUOROMETHANE	<0.001
HEXACHLOROBUTADIENE	<0.001
ISOPROPYLBENZENE	<0.001
N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FID) or calculated (CALC)
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10-4	10-4	10-4
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10-6	10-6	10-6
10-7	10-7	10-7
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Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	45.07	44.73	45.37	43.84	44.11	42.08	44.64
PH (FLD)				7.03	6.85	7.06	7.51
PH				7.3	7.1	7.0	
SC (UMHOS/CM AT 25 C)				1450.0	1390.0	1890.0	
SC (UMHOS/CM AT 25 C) (FLD)				1501.0	1394.0	2055.0	1686.0
TDS (MEASURED AT 180 C)				955.0	905.0		
TOTAL SUSPENDED SOLIDS				2140.0	66.0		
WATER TEMPERATURE (C) (FLD)		10.0		5.9	15.3	7.6	10.2
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS				168.0	163.0		
MAGNESIUM (MG) DIS				58.0	56.0		
SODIUM (NA) DIS				68.0	65.0		
POTASSIUM (K) DIS				4.0	4.0		
TOTAL ALKALINITY AS CaCO3				526.0	464.0		
BICARBONATE (HCO3)				642.0	566.0		
CARBONATE AS CO3				0.0	0.0		
SULFATE (SO4)				162.0	162.0	197.0	
CHLORIDE (CL)				101.0	93.0	159.0	
-- NUTRIENTS --							
AMMONIA (NH3 AS N)				<0.1	<0.1		
NITRATE (NO3-N)				2.94	2.77	2.09	
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) DIS						<0.05	<0.05
ARSENIC (AS) DIS				<0.005	<0.005	<0.005	<0.005
BARIUM (BA) DIS				<0.1	<0.1	<0.1	0.1
BERYLLIUM (BE) DIS						<0.001	<0.001
CADMIUM (CD) DIS				<0.001	<0.001	<0.001	<0.001
CHROMIUM (CR) DIS				<0.01	<0.01	<0.01	<0.01
COBALT (CO) DIS						<0.01	<0.01
COPPER (CU) DIS						<0.01	<0.01
IRON (FE) DIS				<0.03	<0.03	<0.03	
LEAD (PB) DIS				<0.01	<0.01	<0.01	<0.01
MANGANESE (MN) DIS				<0.02	0.01		
MERCURY (HG) DIS				<0.001	<0.001	<0.001	<0.001
NICKEL (NI) DIS						0.06	0.02
SELENIUM (SE) DIS				<0.005	<0.005	<0.005	<0.005
SILVER (AG) DIS				<0.005	<0.005	<0.005	<0.005
THALLIUM (TL) DIS						<0.1	<0.1
TIN (SN) DIS							<0.1
VANADIUM (V) DIS						<0.1	<0.1
ZINC (ZN) DIS						<0.01	0.02
-- VOLATILE ORGANICS --							
ACETONITRILE METHYLCYANIDE							<0.02
ALLYLCHLORIDE 3-CHLORO-1-PROPENE							<0.001
1,1,1,2-TETRACHLOROETHANE						<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	0.00065	0.00074	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0038	0.0058	0.0049	0.0059	0.0044	0.0026	0.0036
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE							<0.001
1,2-DIBROMOETHANE						<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101
-- VOLATILE ORGANICS --							
1,2-DICHLOROPROPANE						0.0046	0.0028
2,2-DICHLOROPROPANE							<0.001
2-BUTANONE (METHYL-ETHYL-KETONE)	<0.01						
2-CHLOROETHYL VINYL ETHER	<0.01	<0.01	<0.01	<0.001	<0.001		
2-HEXANONE	<0.01					<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01	<0.01	<0.01	<0.01		
4-METHYL-2-PENTANONE	<0.01						
ACETONE	<0.01					<0.02	<0.05
ACROLEIN	<0.01						<0.02
ACRYLONITRILE	<0.01					<0.02	<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.01					<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.007	0.015	0.016	0.015	0.011	0.0056	0.0061
CHLORMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE							<0.001
CIS-1,2-DICHLOROETHENE						0.0017	0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.011	0.007	0.016	0.0037	0.0062	0.0016	0.0044
ETHANOL	<0.01						
ETHYL METHACRYLATE	<0.01	<0.01	<0.01	<0.001	<0.001		<0.001
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
ISOBUTANOL							<0.05
TOTAL XYLENE	<0.001	<0.001	<0.001	<0.001	<0.001		
M-P XYLENE						<0.001	
O-XYLENE						<0.001	<0.001
METHACRYLONITRILE							<0.02
METHYL ETHYL KETONE							<0.02
METHYL ETHYL KETONE						<0.02	
METHYL ISOBUTYL KETONE						<0.02	<0.02
METHYL METHACRYLATE							<0.002
METHYLENE CHLORIDE	0.0042	0.0034	0.0012	0.0012	0.0014	0.0023	<0.001
PROPIONITRILE ETHYLCYANIDE							<0.02
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.066	0.081	0.079	0.094	0.059	0.036	0.033
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0074	0.0054	0.0059	0.0049	0.0034	0.0017	0.0022
TRICHLOROFLUOROMETHANE	0.0043	0.0078	0.0083	0.0055	0.0051	0.0016	0.003
VINYL ACETATE	<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
PICLORAM							<0.0005
-- SEMI-VOLATILE EXTRACTABLES --							
ALPHA-CHLORDANE							<0.00005
1,4-BENZENEDIAMINE							ND
CHLOROBENZILATE							<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

TABLE 1. SUMMARY OF DATA FOR THE STUDY

STATION	DATE	TIME	WIND	TEMP	HUMID	PRECIP	WAVE
1	1/1/80	12:00	10	15	60	0.0	2
2	1/1/80	13:00	12	16	62	0.0	3
3	1/1/80	14:00	15	17	65	0.0	4
4	1/1/80	15:00	18	18	68	0.0	5
5	1/1/80	16:00	20	19	70	0.0	6
6	1/1/80	17:00	22	20	72	0.0	7
7	1/1/80	18:00	25	21	75	0.0	8
8	1/1/80	19:00	28	22	78	0.0	9
9	1/1/80	20:00	30	23	80	0.0	10
10	1/1/80	21:00	32	24	82	0.0	11
11	1/1/80	22:00	35	25	85	0.0	12
12	1/1/80	23:00	38	26	88	0.0	13
13	1/2/80	00:00	40	27	90	0.0	14
14	1/2/80	01:00	42	28	92	0.0	15
15	1/2/80	02:00	45	29	95	0.0	16
16	1/2/80	03:00	48	30	98	0.0	17
17	1/2/80	04:00	50	31	100	0.0	18
18	1/2/80	05:00	52	32	102	0.0	19
19	1/2/80	06:00	55	33	105	0.0	20
20	1/2/80	07:00	58	34	108	0.0	21
21	1/2/80	08:00	60	35	110	0.0	22
22	1/2/80	09:00	62	36	112	0.0	23
23	1/2/80	10:00	65	37	115	0.0	24
24	1/2/80	11:00	68	38	118	0.0	25
25	1/2/80	12:00	70	39	120	0.0	26
26	1/2/80	13:00	72	40	122	0.0	27
27	1/2/80	14:00	75	41	125	0.0	28
28	1/2/80	15:00	78	42	128	0.0	29
29	1/2/80	16:00	80	43	130	0.0	30
30	1/2/80	17:00	82	44	132	0.0	31
31	1/2/80	18:00	85	45	135	0.0	32
32	1/2/80	19:00	88	46	138	0.0	33
33	1/2/80	20:00	90	47	140	0.0	34
34	1/2/80	21:00	92	48	142	0.0	35
35	1/2/80	22:00	95	49	145	0.0	36
36	1/2/80	23:00	98	50	148	0.0	37
37	1/3/80	00:00	100	51	150	0.0	38
38	1/3/80	01:00	102	52	152	0.0	39
39	1/3/80	02:00	105	53	155	0.0	40
40	1/3/80	03:00	108	54	158	0.0	41
41	1/3/80	04:00	110	55	160	0.0	42
42	1/3/80	05:00	112	56	162	0.0	43
43	1/3/80	06:00	115	57	165	0.0	44
44	1/3/80	07:00	118	58	168	0.0	45
45	1/3/80	08:00	120	59	170	0.0	46
46	1/3/80	09:00	122	60	172	0.0	47
47	1/3/80	10:00	125	61	175	0.0	48
48	1/3/80	11:00	128	62	178	0.0	49
49	1/3/80	12:00	130	63	180	0.0	50
50	1/3/80	13:00	132	64	182	0.0	51
51	1/3/80	14:00	135	65	185	0.0	52
52	1/3/80	15:00	138	66	188	0.0	53
53	1/3/80	16:00	140	67	190	0.0	54
54	1/3/80	17:00	142	68	192	0.0	55
55	1/3/80	18:00	145	69	195	0.0	56
56	1/3/80	19:00	148	70	198	0.0	57
57	1/3/80	20:00	150	71	200	0.0	58
58	1/3/80	21:00	152	72	202	0.0	59
59	1/3/80	22:00	155	73	205	0.0	60
60	1/3/80	23:00	158	74	208	0.0	61
61	1/4/80	00:00	160	75	210	0.0	62
62	1/4/80	01:00	162	76	212	0.0	63
63	1/4/80	02:00	165	77	215	0.0	64
64	1/4/80	03:00	168	78	218	0.0	65
65	1/4/80	04:00	170	79	220	0.0	66
66	1/4/80	05:00	172	80	222	0.0	67
67	1/4/80	06:00	175	81	225	0.0	68
68	1/4/80	07:00	178	82	228	0.0	69
69	1/4/80	08:00	180	83	230	0.0	70
70	1/4/80	09:00	182	84	232	0.0	71
71	1/4/80	10:00	185	85	235	0.0	72
72	1/4/80	11:00	188	86	238	0.0	73
73	1/4/80	12:00	190	87	240	0.0	74
74	1/4/80	13:00	192	88	242	0.0	75
75	1/4/80	14:00	195	89	245	0.0	76
76	1/4/80	15:00	198	90	248	0.0	77
77	1/4/80	16:00	200	91	250	0.0	78
78	1/4/80	17:00	202	92	252	0.0	79
79	1/4/80	18:00	205	93	255	0.0	80
80	1/4/80	19:00	208	94	258	0.0	81
81	1/4/80	20:00	210	95	260	0.0	82
82	1/4/80	21:00	212	96	262	0.0	83
83	1/4/80	22:00	215	97	265	0.0	84
84	1/4/80	23:00	218	98	268	0.0	85
85	1/5/80	00:00	220	99	270	0.0	86
86	1/5/80	01:00	222	100	272	0.0	87
87	1/5/80	02:00	225	101	275	0.0	88
88	1/5/80	03:00	228	102	278	0.0	89
89	1/5/80	04:00	230	103	280	0.0	90
90	1/5/80	05:00	232	104	282	0.0	91
91	1/5/80	06:00	235	105	285	0.0	92
92	1/5/80	07:00	238	106	288	0.0	93
93	1/5/80	08:00	240	107	290	0.0	94
94	1/5/80	09:00	242	108	292	0.0	95
95	1/5/80	10:00	245	109	295	0.0	96
96	1/5/80	11:00	248	110	298	0.0	97
97	1/5/80	12:00	250	111	300	0.0	98
98	1/5/80	13:00	252	112	302	0.0	99
99	1/5/80	14:00	255	113	305	0.0	100

NOTE: All values are in SI units. Wind speed is in m/s, temperature is in °C, humidity is in %, precipitation is in mm, and wave height is in m. Data were collected from 1/1/80 to 1/5/80.

Sample Type: Monitoring Wells

	SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
	SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
	SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
	LAB	EL	EL	EL	EL	EL	EL	EL
	LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
	SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101
-- SEMI-VOLATILE EXTRACTABLES --								
1,2,3-TRICHLOROPROPANE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE								<0.01
1,2,4-TRICHLOROBENZENE								<0.001
1,2-DIBROMO-3-CHLOROPROPANE							<0.001	<0.001
1,2-DICHLOROBENZENE							<0.001	<0.001
1,3,5-TRINITROBENZENE								<0.01
1,3-DICHLOROBENZENE								<0.001
1,3-DICHLOROPROPANE								<0.001
1,3-DINITROBENZENE								<0.01
TRANS-1,4-DICHLORO-2-BUTENE							<0.002	
1,4-DICHLORO-2-BUTENE		<0.01						<0.002
1,4-DICHLOROBENZENE							<0.001	<0.001
1,4-DIFLUOROBENZENE		<0.01	<0.01	<0.01	<0.001	<0.001		
METHAPYRILENE								ND
1-METHYLNAPHTHALENE								<0.01
1-NAPHTHYLAMINE								<0.01
2,3,4,6-TETRACHLOROPHENOL								<0.01
2,4,5-TRICHLOROPHENOL								<0.01
2,4,6-TRICHLOROPHENOL								<0.01
2,4-DICHLOROPHENOL								<0.01
2,4-DIMETHYLPHENOL								<0.01
2,4-DINITROPHENOL								<0.05
2,4-DINITROTOLUENE								<0.01
2,6-DICHLOROPHENOL								<0.01
2,6-DINITROTOLUENE								<0.01
2-CHLORONAPHTHALENE								<0.01
2-CHLOROPHENOL								<0.01
2-METHYLNAPHTHALENE								<0.01
2-METHYLPHENOL (O-CRESOL)								<0.01
2-NAPHTHYLAMINE								<0.01
2-NITROANILINE								<0.01
2-NITROPHENOL								<0.01
2-PICOLINE								<0.01
3,3-DICHLOROBENZIDINE								<0.02
3-METHYLCHOLANTHRENE								<0.1
3-NITROANILINE								<0.01
4,6-DINITRO-2-METHYLPHENOL								<0.05
4-AMINOBIIPHENYL								<0.01
4-BROMOPHENYL PHENYL ETHER								<0.01
4-CHLORO-3-METHYLPHENOL								<0.01
4-CHLORO-2-METHYLPHENOL								<0.01
4-CHLOROPHENOL								<0.01
4-CHLOROPHENYL PHENYL ETHER								<0.01
4-METHYLPHENOL/3-METHYLPHENOL								<0.01
4-NITROANILINE								<0.01
4-NITROPHENOL								<0.0005
7,12-DIMETHYLBENZENE (A) ANTHRACENE								<0.01
A,A-DIMETHYLPHENETHYLAMINE								ND
ACENAPHTHENE								<0.01
ACENAPHTHYLENE								<0.01
ACETOPHENONE								<0.01
ANILINE								<0.01
ANTHRACENE								<0.01
ARAMITE								<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)								<0.01
BENZIDINE								<0.02
BENZO (A) ANTHRACENE								<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101

-- SEMI-VOLATILE EXTRACTABLES --

BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DINOSES	<0.001
DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLORO BENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHROPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1
PARATHION	<0.01
PENTACHLORO BENZENE	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101

-- SEMI-VOLATILE EXTRACTABLES --

PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.00005
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIOAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001
ACIFLOURFEN	<0.0005
BENTAZON	<0.0025
CHLORAMBN	<0.0005
DACIHAL	<0.001
DALAPON	<0.01
DICAMBA	0.00026
DICHLORPROP	<0.001
AROCLOR 1016	<0.001
AROCLOR 1221	<0.002
AROCLOR 1232	<0.001
AROCLOR 1242	<0.001
AROCLOR 1248	<0.001
AROCLOR 1254	<0.001
AROCLOR 1260	<0.001
AROCLOR 1262	<0.001
AROCLOR 1268	<0.001
2,4-D	<0.001
2,4-DB	<0.0025
DIALATE (AVADEX)	<0.01
3,5-DICHLOROBEZOIC ACID	<0.0005
DIMETHOATE (CYGON)	<0.1
DISULFOTON	<0.01
MCPA	<0.2
MCPP	<0.2
METHYL PARATHION (PENNCAP-M)	<0.01
PHORATE (THIMET)	<0.01
SULFOTEP	<0.01
2,4,5-T	<0.0002
2,4,5-TP (SILVEX)	<0.0002

-- OTHER PARAMETERS --

4;4'-DDD	<0.0001			
4;4'-DDE	<0.0001			
4;4'-DDT	<0.0001			
ALDRIN	<0.00005			
ALPHA-BHC	<0.00005			
BETA-BHC	<0.00005			
GAMMA-CHLORDANE	<0.00005			
CYANIDE (CN) TOT	<0.005	<0.005	<0.005	<0.005
DELTA-BHC	<0.00005			
DIELDRIN	<0.0001			
ENDOSULFAN I	<0.00005			
ENDOSULFAN II	<0.0001			
ENDOSULFAN SULFATE	<0.0001			

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1	EPA-1
SAMPLE DATE	04/05/91	01/22/92	05/20/92	11/17/92	05/25/93	12/15/93	04/08/94
SAMPLE TIME	12:00	09:45	13:30	08:00	09:00	10:45	16:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12768	92-4687	92-19275	92-49147	93-20448	93-59621	94-13572
SAMPLE NUMBER	HL-9104-105	HL-9201-103	HL-9205-123	HL-9211-106	HL-9305-101	HL-9312-101	HL-9404-101

-- OTHER PARAMETERS --

ENDRIN							<0.0001
ENDRIN ALDEHYDE							<0.0001
ENDRIN KETONE							<0.0001
GAMMA-BHC (LINDANE)							<0.00005
HEPTACHLOR							<0.00005
HEPTACHLOR EPOXIDE							<0.00005
METHOXYCHLOR							<0.0005
PRONAMIDE							<0.01
SULFIDE AS S							<0.04
CHEMICAL OXYGEN DEMAND				18.0	<1.0	16.0	
TOXAPHENE							<0.005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1
SAMPLE DATE	08/24/94	11/21/94
SAMPLE TIME	13:00	10:30
LAB	EL	EL
LAB NUMBER	94-40098	94-58155
SAMPLE NUMBER	HL-9408-100	HL-9411-102

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	44.76	45.02
PH (FLD)	7.22	7.08
PH		6.8
SC (UMHOS/CM AT 25 C)		1700.0
SC (UMHOS/CM AT 25 C) (FLD)	1400.0	1583.0
WATER TEMPERATURE (C) (FLD)	14.8	8.3

-- MAJOR CONSTITUENTS --

SULFATE (SO4)	159.0
CHLORIDE (CL)	134.0

-- NUTRIENTS --

NITRATE + NITRITE AS N	6.18
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05
ARSENIC (AS) DIS	<0.005
BARIUM (BA) DIS	0.1
BERYLLIUM (BE) DIS	<0.001
CADMIUM (CD) DIS	<0.001
CHROMIUM (CR) DIS	<0.01
COBALT (CO) DIS	<0.01
COPPER (CU) DIS	<0.01
IRON (FE) DIS	<0.03
LEAD (PB) DIS	<0.01
MERCURY (HG) DIS	<0.001
NICKEL (NI) DIS	0.01
SELENIUM (SE) DIS	<0.005
SILVER (AG) DIS	<0.005
THALLIUM (TL) DIS	<0.1
VANADIUM (V) DIS	<0.1
ZINC (ZN) DIS	<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	0.002	0.0028
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	0.0018	0.0025
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.0048	0.006
CHLOROMETHANE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1. Summary of data

Year	1981	1982	1983
1981	1981	1981	1981
1982	1982	1982	1982
1983	1983	1983	1983
1984	1984	1984	1984
1985	1985	1985	1985
1986	1986	1986	1986
1987	1987	1987	1987
1988	1988	1988	1988
1989	1989	1989	1989
1990	1990	1990	1990
1991	1991	1991	1991
1992	1992	1992	1992
1993	1993	1993	1993
1994	1994	1994	1994
1995	1995	1995	1995
1996	1996	1996	1996
1997	1997	1997	1997
1998	1998	1998	1998
1999	1999	1999	1999
2000	2000	2000	2000
2001	2001	2001	2001
2002	2002	2002	2002
2003	2003	2003	2003
2004	2004	2004	2004
2005	2005	2005	2005
2006	2006	2006	2006
2007	2007	2007	2007
2008	2008	2008	2008
2009	2009	2009	2009
2010	2010	2010	2010
2011	2011	2011	2011
2012	2012	2012	2012
2013	2013	2013	2013
2014	2014	2014	2014
2015	2015	2015	2015
2016	2016	2016	2016
2017	2017	2017	2017
2018	2018	2018	2018
2019	2019	2019	2019
2020	2020	2020	2020
2021	2021	2021	2021
2022	2022	2022	2022
2023	2023	2023	2023
2024	2024	2024	2024
2025	2025	2025	2025
2026	2026	2026	2026
2027	2027	2027	2027
2028	2028	2028	2028
2029	2029	2029	2029
2030	2030	2030	2030
2031	2031	2031	2031
2032	2032	2032	2032
2033	2033	2033	2033
2034	2034	2034	2034
2035	2035	2035	2035
2036	2036	2036	2036
2037	2037	2037	2037
2038	2038	2038	2038
2039	2039	2039	2039
2040	2040	2040	2040
2041	2041	2041	2041
2042	2042	2042	2042
2043	2043	2043	2043
2044	2044	2044	2044
2045	2045	2045	2045
2046	2046	2046	2046
2047	2047	2047	2047
2048	2048	2048	2048
2049	2049	2049	2049
2050	2050	2050	2050
2051	2051	2051	2051
2052	2052	2052	2052
2053	2053	2053	2053
2054	2054	2054	2054
2055	2055	2055	2055
2056	2056	2056	2056
2057	2057	2057	2057
2058	2058	2058	2058
2059	2059	2059	2059
2060	2060	2060	2060
2061	2061	2061	2061
2062	2062	2062	2062
2063	2063	2063	2063
2064	2064	2064	2064
2065	2065	2065	2065
2066	2066	2066	2066
2067	2067	2067	2067
2068	2068	2068	2068
2069	2069	2069	2069
2070	2070	2070	2070
2071	2071	2071	2071
2072	2072	2072	2072
2073	2073	2073	2073
2074	2074	2074	2074
2075	2075	2075	2075
2076	2076	2076	2076
2077	2077	2077	2077
2078	2078	2078	2078
2079	2079	2079	2079
2080	2080	2080	2080
2081	2081	2081	2081
2082	2082	2082	2082
2083	2083	2083	2083
2084	2084	2084	2084
2085	2085	2085	2085
2086	2086	2086	2086
2087	2087	2087	2087
2088	2088	2088	2088
2089	2089	2089	2089
2090	2090	2090	2090
2091	2091	2091	2091
2092	2092	2092	2092
2093	2093	2093	2093
2094	2094	2094	2094
2095	2095	2095	2095
2096	2096	2096	2096
2097	2097	2097	2097
2098	2098	2098	2098
2099	2099	2099	2099
2100	2100	2100	2100

Sample Type: Monitoring Wells

SITE CODE	EPA-1	EPA-1
SAMPLE DATE	08/24/94	11/21/94
SAMPLE TIME	13:00	10:30
LAB	EL	EL
LAB NUMBER	94-40098	94-58155
SAMPLE NUMBER	HL-9408-100	HL-9411-102

-- VOLATILE ORGANICS --

CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.002	0.0028
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE	<0.02	
METHYL ETHYL KETONE		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	0.041	0.041
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	0.0012	0.0018
TRICHLOROFLUOROMETHANE	0.0018	0.0022
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002
1,4-DICHLOROBENZENE	<0.001	<0.001

-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001
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-- OTHER PARAMETERS --

CYANIDE (CN) TOT		<0.005
CHEMICAL OXYGEN DEMAND		11.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	FAIR GRND
SAMPLE DATE	06/05/90
SAMPLE TIME	10:45
LAB	EL
LAB NUMBER	90-15039
SAMPLE NUMBER	HL-9006-101

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROETHENE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	0.0053
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.088
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.0005
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.0005
TRICHLOROFUOROMETHANE	<0.001
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001
1,2,3-TRICHLOROPROPANE	<0.001
1,2,4-TRICHLOROBENZENE	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001
1,3-DICHLOROBENZENE	<0.001
1,3-DICHLOROPROPANE	<0.001
1,4-DICHLOROBENZENE	<0.0005
DICHLOROMONOFUOROMETHANE	<0.001
HEXACHLOROBUTADIENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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SITE CODE	FAIR GRND
SAMPLE DATE	06/05/90
SAMPLE TIME	10:45
LAB	EL
LAB NUMBER	90-15039
SAMPLE NUMBER	HL-9006-101

ISOPROPYLBENZENE	<0.001
N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

Hydrometrics, Inc. 02/02/95

Table 1. - (Continued)

1954-55
1955-56
1956-57
1957-58
1958-59
1959-60

1960-61
1961-62
1962-63
1963-64
1964-65
1965-66
1966-67

1967-68
1968-69
1969-70
1970-71
1971-72
1972-73

1973-74
1974-75
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1977-78
1978-79

1979-80
1980-81
1981-82
1982-83
1983-84
1984-85

1985-86
1986-87
1987-88
1988-89
1989-90
1990-91

1991-92
1992-93
1993-94
1994-95
1995-96
1996-97

1997-98
1998-99
1999-00
2000-01
2001-02
2002-03

2003-04
2004-05
2005-06
2006-07
2007-08
2008-09

2009-10
2010-11
2011-12
2012-13
2013-14
2014-15

2015-16
2016-17
2017-18
2018-19
2019-20
2020-21

2021-22
2022-23
2023-24
2024-25
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2030-31
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2034-35
2035-36
2036-37
2037-38
2038-39

2039-40
2040-41
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2042-43
2043-44
2044-45

2045-46
2046-47
2047-48
2048-49
2049-50
2050-51

2051-52
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2053-54
2054-55
2055-56
2056-57

2057-58
2058-59
2059-60
2060-61
2061-62
2062-63

Sample Type: Monitoring Wells

SITE CODE	HL-1	HL-1
SAMPLE DATE	11/13/89	05/06/90
SAMPLE TIME	11:30	11:25
LAB	EL	EL
LAB NUMBER	89-20185	90-10827
SAMPLE NUMBER	HL-8911-006	HL-9005-110

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	17.53
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-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005
1,1-DICHLOROPROPENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.00005	<0.0005
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	<0.001
2-CHLOROTOLUENE	<0.001	<0.001
4-CHLOROTOLUENE	<0.001	<0.001
BENZENE	<0.0005	<0.0005
BROMOBENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005
CHLOROETHANE	<0.001	<0.001
CHLOROETHENE	<0.001	<0.001
CHLOROFORM	0.0035	0.0079
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
M-XYLENE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
P-XYLENE	<0.001	<0.001
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.0005	0.00083
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	<0.001
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001	<0.001
1,3-DICHLOROBENZENE	<0.001	<0.001
1,3-DICHLOROPROPANE	<0.001	<0.001
1,4-DICHLOROBENZENE	<0.0005	<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Summary of Data for the 1970-1971 Flooding Period

Station	1970-1971	1971-1972	1972-1973
1. Station 1	1.00	1.00	1.00
2. Station 2	1.00	1.00	1.00
3. Station 3	1.00	1.00	1.00
4. Station 4	1.00	1.00	1.00
5. Station 5	1.00	1.00	1.00
6. Station 6	1.00	1.00	1.00
7. Station 7	1.00	1.00	1.00
8. Station 8	1.00	1.00	1.00
9. Station 9	1.00	1.00	1.00
10. Station 10	1.00	1.00	1.00
11. Station 11	1.00	1.00	1.00
12. Station 12	1.00	1.00	1.00
13. Station 13	1.00	1.00	1.00
14. Station 14	1.00	1.00	1.00
15. Station 15	1.00	1.00	1.00
16. Station 16	1.00	1.00	1.00
17. Station 17	1.00	1.00	1.00
18. Station 18	1.00	1.00	1.00
19. Station 19	1.00	1.00	1.00
20. Station 20	1.00	1.00	1.00
21. Station 21	1.00	1.00	1.00
22. Station 22	1.00	1.00	1.00
23. Station 23	1.00	1.00	1.00
24. Station 24	1.00	1.00	1.00
25. Station 25	1.00	1.00	1.00
26. Station 26	1.00	1.00	1.00
27. Station 27	1.00	1.00	1.00
28. Station 28	1.00	1.00	1.00
29. Station 29	1.00	1.00	1.00
30. Station 30	1.00	1.00	1.00
31. Station 31	1.00	1.00	1.00
32. Station 32	1.00	1.00	1.00
33. Station 33	1.00	1.00	1.00
34. Station 34	1.00	1.00	1.00
35. Station 35	1.00	1.00	1.00
36. Station 36	1.00	1.00	1.00
37. Station 37	1.00	1.00	1.00
38. Station 38	1.00	1.00	1.00
39. Station 39	1.00	1.00	1.00
40. Station 40	1.00	1.00	1.00
41. Station 41	1.00	1.00	1.00
42. Station 42	1.00	1.00	1.00
43. Station 43	1.00	1.00	1.00
44. Station 44	1.00	1.00	1.00
45. Station 45	1.00	1.00	1.00
46. Station 46	1.00	1.00	1.00
47. Station 47	1.00	1.00	1.00
48. Station 48	1.00	1.00	1.00
49. Station 49	1.00	1.00	1.00
50. Station 50	1.00	1.00	1.00
51. Station 51	1.00	1.00	1.00
52. Station 52	1.00	1.00	1.00
53. Station 53	1.00	1.00	1.00
54. Station 54	1.00	1.00	1.00
55. Station 55	1.00	1.00	1.00
56. Station 56	1.00	1.00	1.00
57. Station 57	1.00	1.00	1.00
58. Station 58	1.00	1.00	1.00
59. Station 59	1.00	1.00	1.00
60. Station 60	1.00	1.00	1.00
61. Station 61	1.00	1.00	1.00
62. Station 62	1.00	1.00	1.00
63. Station 63	1.00	1.00	1.00
64. Station 64	1.00	1.00	1.00
65. Station 65	1.00	1.00	1.00
66. Station 66	1.00	1.00	1.00
67. Station 67	1.00	1.00	1.00
68. Station 68	1.00	1.00	1.00
69. Station 69	1.00	1.00	1.00
70. Station 70	1.00	1.00	1.00
71. Station 71	1.00	1.00	1.00
72. Station 72	1.00	1.00	1.00
73. Station 73	1.00	1.00	1.00
74. Station 74	1.00	1.00	1.00
75. Station 75	1.00	1.00	1.00
76. Station 76	1.00	1.00	1.00
77. Station 77	1.00	1.00	1.00
78. Station 78	1.00	1.00	1.00
79. Station 79	1.00	1.00	1.00
80. Station 80	1.00	1.00	1.00
81. Station 81	1.00	1.00	1.00
82. Station 82	1.00	1.00	1.00
83. Station 83	1.00	1.00	1.00
84. Station 84	1.00	1.00	1.00
85. Station 85	1.00	1.00	1.00
86. Station 86	1.00	1.00	1.00
87. Station 87	1.00	1.00	1.00
88. Station 88	1.00	1.00	1.00
89. Station 89	1.00	1.00	1.00
90. Station 90	1.00	1.00	1.00
91. Station 91	1.00	1.00	1.00
92. Station 92	1.00	1.00	1.00
93. Station 93	1.00	1.00	1.00
94. Station 94	1.00	1.00	1.00
95. Station 95	1.00	1.00	1.00
96. Station 96	1.00	1.00	1.00
97. Station 97	1.00	1.00	1.00
98. Station 98	1.00	1.00	1.00
99. Station 99	1.00	1.00	1.00
100. Station 100	1.00	1.00	1.00

Sample Type: Monitoring Wells

SITE CODE	HL-1	HL-1
SAMPLE DATE	11/13/89	05/06/90
SAMPLE TIME	11:30	11:25
LAB	EL	EL
LAB NUMBER	89-20185	90-10827
SAMPLE NUMBER	HL-8911-006	HL-9005-110

-- SEMI-VOLATILE EXTRACTABLES --

DICHLOROMONOFUOROMETHANE		<0.001
HEXACHLOROBUTADIENE	<0.001	<0.001
ISOPROPYLBENZENE	<0.001	<0.001
N-BUTYLBENZENE	<0.001	<0.001
N-PROPYLBENZENE	<0.001	<0.001
NAPHTHALENE	<0.001	<0.001
P-ISOPROPYLTOLUENE	<0.001	<0.001
SEC-BUTYLBENZENE	<0.001	<0.001
TERT-BUTYLBENZENE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1. - (Continued)

1951	1952	1953
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000

10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000
10,000	10,000	10,000

Sample Type: Monitoring Wells

SITE CODE	HL-2
SAMPLE DATE	11/13/89
SAMPLE TIME	11:20
LAB	HYDRO
LAB NUMBER	
SAMPLE NUMBER	HL-8911-902

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	27.17
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

STATE OF NEW YORK

ALBANY: J. B. LIPPINCOTT & CO.,
PRINTERS, 1874.

ALBANY: J. B. LIPPINCOTT & CO.,
PRINTERS, 1874.

Sample Type: Monitoring Wells

SITE CODE HL-3
SAMPLE DATE 11/13/89
SAMPLE TIME 11:50
LAB HYDRO
LAB NUMBER
SAMPLE NUMBER HL-8911-903

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET) DRY

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FID) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-5	HL-5
SAMPLE DATE	11/13/89	05/06/90
SAMPLE TIME	11:40	11:45
LAB	HYDRO	EL
LAB NUMBER		90-10829
SAMPLE NUMBER	HL-8911-905	HL-9005-112

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	29.31
-----------------------------	-------

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBEZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0023
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	0.001
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.0005
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.0005
TRICHLOROFLUOROMETHANE	<0.001
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBEZENE	<0.001
1,2,3-TRICHLOROPROPANE	<0.001
1,2,4-TRICHLOROBEZENE	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBEZENE	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001
1,3-DICHLOROBEZENE	<0.001
1,3-DICHLOROPROPANE	<0.001
1,4-DICHLOROBEZENE	<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Sample Type: Monitoring Wells

SITE CODE	HL-5	HL-5
SAMPLE DATE	11/13/89	05/06/90
SAMPLE TIME	11:40	11:45
LAB	HYDRO	EL
LAB NUMBER		90-10829
SAMPLE NUMBER	HL-8911-905	HL-9005-112

-- SEMI-VOLATILE EXTRACTABLES --

DICHLOROMONOFUOROMETHANE	<0.001
HEXACHLOROBUTADIENE	<0.001
ISOPROPYLBENZENE	<0.001
N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

STATE OF NEW YORK

ALBANY, JANUARY 1, 1884.

TO THE COMMISSIONER OF THE GENERAL LAND OFFICE.

BY THE COMMISSIONER OF THE GENERAL LAND OFFICE.

IN RESPONSE TO A RESOLUTION OF THE SENATE, PASSED MAY 1, 1883.

ALBANY: J. B. LEECH, PRINTING OFFICE, 1884.

ALBANY: J. B. LEECH, PRINTING OFFICE, 1884.

ALBANY: J. B. LEECH, PRINTING OFFICE, 1884.

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ALBANY: J. B. LEECH, PRINTING OFFICE, 1884.

ALBANY: J. B. LEECH, PRINTING OFFICE, 1884.

Sample Type: Monitoring Wells

SITE CODE	HL-6
SAMPLE DATE	05/06/90
SAMPLE TIME	12:00
LAB	EL
LAB NUMBER	90-10830
SAMPLE NUMBER	HL-9005-113

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.002
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.0005
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.0005
TRICHLOROFLUOROMETHANE	<0.001
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001
1,2,3-TRICHLOROPROPANE	<0.001
1,2,4-TRICHLOROBENZENE	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001
1,3-DICHLOROBENZENE	<0.001
1,3-DICHLOROPROPANE	<0.001
1,4-DICHLOROBENZENE	<0.0005
DICHLOROMONOFUOROMETHANE	<0.001
HEXACHLOROBUTADIENE	<0.001
ISOPROPYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-6
SAMPLE DATE	05/06/90
SAMPLE TIME	12:00
LAB	EL
LAB NUMBER	90-10830
SAMPLE NUMBER	HL-9005-113

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Geological Survey

WATER RESOURCES DIVISION
WASHINGTON, D. C.
20506

REPORT OF THE
COMMISSIONER OF THE
GEOLOGICAL SURVEY
ON THE
PROGRESS OF THE
WORK DURING THE
YEAR 1964

BY
J. W. GARDNER

AND
J. W. GARDNER

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J. W. GARDNER

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AND
J. W. GARDNER

Sample Type: Monitoring Wells

SITE CODE	HL-7
SAMPLE DATE	11/11/89
SAMPLE TIME	17:55
LAB	EL
LAB NUMBER	89-20182
SAMPLE NUMBER	HL-8911-003

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	10.41
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-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	0.0071
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	0.0058
1,1-DICHLOROETHENE	<0.0005
1,1-DICHLOROPROPENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.0005
1,2-DICHLOROPROPANE	<0.001
2,2-DICHLOROPROPANE	<0.001
2-CHLOROTOLUENE	<0.001
4-CHLOROTOLUENE	<0.001
BENZENE	<0.0005
BROMOBENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0023
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	0.016
ETHYLBENZENE	<0.001
M-XYLENE	<0.001
O-XYLENE	<0.001
P-XYLENE	<0.001
METHYLENE CHLORIDE	0.0017
STYRENE	<0.001
TETRACHLOROETHENE	0.0045
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	0.0035
TRICHLOROFLUOROMETHANE	<0.001
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001
1,2,3-TRICHLOROPROPANE	<0.001
1,2,4-TRICHLOROBENZENE	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001
1,3-DICHLOROBENZENE	<0.001
1,3-DICHLOROPROPANE	<0.001
1,4-DICHLOROBENZENE	<0.0005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE HL-7
 SAMPLE DATE 11/11/89
 SAMPLE TIME 17:55
 LAB EL
 LAB NUMBER 89-20182
 SAMPLE NUMBER HL-8911-003

-- SEMI-VOLATILE EXTRACTABLES --

DICHLOROMONOFUOROMETHANE 0.0063
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001
 N-BUTYLBENZENE <0.001
 N-PROPYLBENZENE <0.001
 NAPHTHALENE <0.001
 P-ISOPROPYLTOLUENE <0.001
 SEC-BUTYLBENZENE <0.001
 TERT-BUTYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

STATE OF NEW YORK

IN SENATE
JANUARY 12, 1911
REPORT OF THE
COMMISSIONER OF THE
LAND OFFICE

ALBANY:
JANUARY 12, 1911
PUBLISHED BY THE
STATE OF NEW YORK
PRINTED BY THE
UNIVERSITY OF THE
STATE OF NEW YORK

THE LAND OFFICE
OF THE STATE OF NEW YORK
HAS THE HONOR TO ACKNOWLEDGE
THE RECEIPT OF THE
REPORT OF THE
COMMISSIONER OF THE
LAND OFFICE
FOR THE YEAR
1910

AND TO TRANSMIT THE SAME
TO THE SENATE
AND TO THE HOUSE OF ASSEMBLY
FOR THEIR CONSIDERATION
AND ACTION

IN WITNESS WHEREOF
I HAVE HEREUNTO SET MY HAND
AND SEAL OF OFFICE
AT ALBANY
THIS 12TH DAY OF JANUARY
1911

JOHN C. WHELAN
GOVERNOR

RECEIVED - NEW YORK OFFICE OF THE ATTORNEY GENERAL

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	02/02/90	05/11/90	04/05/91	04/05/91	01/21/92	05/19/92	11/16/92
SAMPLE TIME	16:15	11:10	15:30	16:00	15:00	12:40	14:20
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2766	90-12198	91-12771	91-12772	92-4684	92-19270	92-49143
REMARKS				DUPLICATE			
SAMPLE NUMBER	HL90-2-101	HL-9005-121	HL-9104-108	HL-9104-118	HL-9201-101	HL-9205-122	HL-9211-102
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	49.19		51.25	51.25	52.23	54.58	55.13
PH (FLD)						7.49	6.58
PH	7.8		7.7	7.6	7.6	7.9	7.5
SC (UMHOS/CM AT 25 C)	1100.0				1050.0	1030.0	1060.0
SC (UMHOS/CM AT 25 C) (FLD)						1017.0	1041.0
TDS (MEASURED AT 180 C)	685.0		687.0	678.0	674.0	636.0	686.0
TOTAL SUSPENDED SOLIDS					146.0	4.0	360.0
WATER TEMPERATURE (C) (FLD)					10.0	13.3	9.4
-- MAJOR CONSTITUENTS --							
TOTAL HARDNESS AS CaCO3	528.0						
CALCIUM (CA) DIS	137.0		144.0	145.0	143.0	113.0	132.0
MAGNESIUM (MG) DIS	45.0		48.0	48.0	50.0	51.0	45.0
SODIUM (NA) DIS	35.0		38.0	37.0	42.0	41.0	36.0
POTASSIUM (K) DIS	3.0		5.0	4.0	6.0	3.0	3.0
TOTAL ALKALINITY AS CaCO3	395.0		402.0	399.0	421.0	396.0	408.0
BICARBONATE (HCO3)	482.0		491.0	487.0	514.0	483.0	499.0
CARBONATE AS CO3	0.0		0.0	0.0	0.0	0.0	0.0
SULFATE (SO4)	132.0		140.0	141.0	139.0	165.0	120.0
CHLORIDE (CL)	31.0		33.0	33.0	33.0	33.0	29.0
-- NUTRIENTS --							
AMMONIA (NH3 AS N)			<0.1		<0.1	<0.1	<0.1
NITRATE (NO3-N)						6.86	6.94
NITRATE + NITRITE AS N	8.4		7.53		5.7		
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS			<0.005		<0.005	<0.005	<0.005
BARIUM (BA) DIS			<0.1		<0.1	<0.1	<0.1
CADMIUM (CD) DIS	0.005		0.001		<0.001	<0.001	<0.001
CHROMIUM (CR) DIS			<0.02		<0.02	<0.01	<0.01
COPPER (CU) DIS	<0.01						
IRON (FE) DIS	<0.03		<0.03		<0.03	<0.03	<0.03
LEAD (PB) DIS	<0.01		<0.01		<0.01	<0.01	<0.01
MANGANESE (MN) DIS			<0.02		<0.02	<0.02	<0.02
MERCURY (HG) DIS			<0.001		<0.001	<0.001	<0.001
SELENIUM (SE) DIS			<0.005		<0.005	<0.005	<0.005
SILVER (AG) DIS			<0.005		<0.005	<0.005	<0.005
ZINC (ZN) DIS	0.02						
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE	<0.001						
1,1,1-TRICHLOROETHANE	0.0074		0.007	0.0066	0.0056	0.0051	0.0052
1,1,2,2-TETRACHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0026		0.0029	0.0028	0.0032	0.0025	0.0034
1,1-DICHLOROETHENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
1,1-DICHLOROPROPENE	<0.001						
1,2-DIBROMOETHANE	<0.001						
1,2-DICHLOROETHANE	0.00058		0.0005	0.0005	<0.0005	<0.0005	<0.001
1,2-DICHLOROPROPANE	<0.001						
2,2-DICHLOROPROPANE	<0.001						
2-BUTANONE (METHYL-ETHYL-KETONE)			<0.01	<0.01			
2-CHLOROETHYL VINYL ETHER			<0.01	<0.01	<0.01	<0.01	<0.001
2-CHLOROTOLUENE	<0.001						
2-HEXANONE			<0.01	<0.01			

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	02/02/90	05/11/90	04/05/91	04/05/91	01/21/92	05/19/92	11/16/92
SAMPLE TIME	16:15	11:10	15:30	16:00	15:00	12:40	14:20
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2766	90-12198	91-12771	91-12772	92-4684	92-19270	92-49143
REMARKS				DUPLICATE			
SAMPLE NUMBER	HL90-2-101	HL-9005-121	HL-9104-108	HL-9104-118	HL-9201-101	HL-9205-122	HL-9211-102
-- VOLATILE ORGANICS --							
4-BROMOFLUOROBENZENE			<0.01	<0.01	<0.01	<0.01	<0.01
4-CHLOROTOLUENE	<0.001						
4-METHYL-2-PENTANONE			<0.01	<0.01			
ACETONE			<0.01	<0.01			
ACROLEIN			<0.01	<0.01			
ACRYLONITRILE			<0.01	<0.01			
BENZENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
BROMOBENZENE	<0.001						
BROMOCHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.01	<0.01			
CARBON TETRACHLORIDE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CHLOROBENZENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0035		0.0041	0.0039	0.0043	0.0038	0.0055
CHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001						
CIS-1,3-DICHLOROPROPENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.015		0.0089	0.0088	0.0054	0.0091	0.0036
ETHANOL			<0.01	<0.01			
ETHYL METHACRYLATE			<0.01	<0.01	<0.01	<0.01	<0.001
ETHYLBENZENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE			<0.01	<0.01	<0.01	<0.01	<0.001
TOTAL XYLENE			<0.001	<0.001	<0.001	<0.001	<0.001
M-XYLENE	<0.001						
O-XYLENE	<0.001						
P-XYLENE	<0.001						
METHYLENE CHLORIDE	0.0036		0.0036	0.0035	0.005	0.0029	0.0014
STYRENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.013		0.012	0.013	0.016	0.014	0.017
TOLUENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0015		0.0022	0.0022	0.0022	0.0021	0.0023
TRICHLOROFLUOROMETHANE	<0.001		0.0028	0.0026	0.0031	0.002	<0.001
VINYL ACETATE			<0.01	<0.01	<0.01	<0.01	<0.02
VINYL CHLORIDE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROBENZENE	<0.001						
1,2,3-TRICHLOROPROPANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.01					
1,2,4-TRIMETHYLBENZENE	<0.001						
1,2-DIBROMO-3-CHLOROPROPANE	<0.001						
1,2-DICHLOROBENZENE	<0.001	<0.01					
1,3,5-TRIMETHYLBENZENE	<0.001						
1,3-DICHLOROBENZENE	<0.001	<0.01					
1,3-DICHLOROPROPANE	<0.001						
1,4-DICHLORO-2-BUTENE			<0.01	<0.01			
1,4-DICHLOROBENZENE	<0.0005	<0.01					
1,4-DIFLUOROBENZENE			<0.01	<0.01	<0.01	<0.01	<0.001
2-METHYL-4,6-DINITROPHENOL		<0.05					

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	02/02/90	05/11/90	04/05/91	04/05/91	01/21/92	05/19/92	11/16/92
SAMPLE TIME	16:15	11:10	15:30	16:00	15:00	12:40	14:20
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2766	90-12198	91-12771	91-12772	92-4684	92-19270	92-49143
REMARKS				DUPLICATE			
SAMPLE NUMBER	HL90-2-101	HL-9005-121	HL-9104-108	HL-9104-118	HL-9201-101	HL-9205-122	HL-9211-102

-- SEMI-VOLATILE EXTRACTABLES --

2,4,6-TRICHLOROPHENOL		<0.01
2,4-DICHLOROPHENOL		<0.01
2,4-DIMETHYLPHENOL		<0.01
2,4-DINITROPHENOL		<0.05
2,4-DINITROTOLUENE		<0.01
2,6-DINITROTOLUENE		<0.01
2-CHLORONAPHTHALENE		<0.01
2-CHLOROPHENOL		<0.01
2-NITROPHENOL		<0.01
3,3-DICHLOROBENZIDINE		<0.01
4-BROMOPHENYL PHENYL ETHER		<0.01
4-CHLORO-3-METHYLPHENOL		<0.01
4-CHLOROPHENYL PHENYL ETHER		<0.01
4-NITROPHENOL		<0.05
ACENAPHTHENE		<0.01
ACENAPHTHYLENE		<0.01
ANTHRACENE		<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)		<0.01
BENZIDINE		<0.01
BENZO (A) ANTHRACENE		<0.01
BENZO (A) PYRENE		<0.01
BENZO (B) FLUORANTHENE		<0.01
BENZO (GHI) PERYLENE		<0.01
BENZO (K) FLUORANTHENE		<0.01
BIS (2-CHLOROETHOXY) METHANE		<0.01
BIS (2-CHLOROETHYL) ETHER		<0.01
BIS (2-CHLOROISOPROPYL) ETHER		<0.01
BIS (2-ETHYLHEXYL) PHTHALATE		<0.01
BUTYL BENZYL PHTHALATE		<0.01
CHRYSENE		<0.01
DI-N-BUTYLPHTHALATE		<0.01
DI-N-OCTYLPHTHALATE		<0.01
DIBENZO (A,H) ANTHRACENE		<0.01
DICHLOROMONOFUOROMETHANE	0.0069	
DIETHYLPHTHALATE		<0.01
DIMETHYLPHTHALATE		<0.01
FLUORANTHENE		<0.01
FLUORENE		<0.01
HEXACHLOROBENZENE		<0.01
HEXACHLOROBUTADIENE	<0.001	<0.01
HEXACHLOROETHANE		<0.01
INDENO (1,2,3-CD) PYRENE		<0.01
ISOPHORONE		<0.01
ISOPROPYLBENZENE	<0.001	
N-BUTYLBENZENE	<0.001	
N-NITROSO-DI-N-PROPYLAMINE		<0.01
N-NITROSOPHENYLAMINE		<0.01
N-PROPYLBENZENE	<0.001	
NAPHTHALENE	<0.001	<0.01
NITROBENZENE		<0.01
P-ISOPROPYLTOLUENE	<0.001	
PENTACHLOROPHENOL		<0.05
PHENANTHRENE		<0.01
PHENOL		<0.01
PYRENE		<0.01
SEC-BUTYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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APPENDIX A: WATER QUALITY ANALYSES SUMMARY REPORT (1989 THROUGH 1994)

DataMan Program

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	02/02/90	05/11/90	04/05/91	04/05/91	01/21/92	05/19/92	11/16/92
SAMPLE TIME	16:15	11:10	15:30	16:00	15:00	12:40	14:20
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2766	90-12198	91-12771	91-12772	92-4684	92-19270	92-49143
REMARKS				DUPLICATE			
SAMPLE NUMBER	HL90-2-101	HL-9005-121	HL-9104-108	HL-9104-118	HL-9201-101	HL-9205-122	HL-9211-102

-- SEMI-VOLATILE EXTRACTABLES --

TERT-BUTYLBENZENE <0.001

-- HYDROCARBONS --

TOTAL ORGANIC CARBON <2.0

-- OTHER PARAMETERS --

CYANIDE (CN) TOT

<0.005

<0.005

<0.005

<0.005

CHEMICAL OXYGEN DEMAND

2.0

4.0

5.0

9.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS	DUPLICATE					
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	50.48	50.48	46.82	47.65	55.51	52.67
PH (FLD)	7.58	7.58	7.23	7.64	7.46	7.46
PH	7.7	7.4	7.3			7.3
SC (UMHOS/CM AT 25 C)	1020.0	1010.0	1070.0			1050.0
SC (UMHOS/CM AT 25 C) (FLD)	1015.0	1015.0	1022.0	1017.0	1022.0	1035.0
TDS (MEASURED AT 180 C)	643.0	650.0				
TOTAL SUSPENDED SOLIDS	138.0	214.0				
WATER TEMPERATURE (C) (FLD)	11.2	11.2	6.9	9.9	11.7	8.9

-- MAJOR CONSTITUENTS --

CALCIUM (CA) DIS	116.0	119.0				
MAGNESIUM (MG) DIS	44.0	44.0				
SODIUM (NA) DIS	38.0	37.0				
POTASSIUM (K) DIS	4.0	4.0				
TOTAL ALKALINITY AS CaCO3	361.0	361.0				
BICARBONATE (HCO3)	441.0	440.0				
CARBONATE AS CO3	0.0	0.0				
SULFATE (SO4)	129.0	129.0	137.0			122.0
CHLORIDE (CL)	31.0	31.0	35.0			29.0

-- NUTRIENTS --

AMMONIA (NH3 AS N)	<0.1	<0.1				
NITRATE (NO3-N)	7.16	7.09	6.13			
NITRATE + NITRITE AS N						6.65

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS			<0.05	<0.05		<0.05
ARSENIC (AS) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
BARIUM (BA) DIS	<0.1	<0.1	<0.1	<0.1		<0.1
BERYLLIUM (BE) DIS			<0.001	<0.001		<0.001
CADMIUM (CD) DIS	<0.001	<0.001	<0.001	<0.001		<0.001
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01		<0.01
COBALT (CO) DIS			<0.01	<0.01		<0.01
COPPER (CU) DIS			<0.01	<0.01		<0.01
IRON (FE) DIS	<0.03	<0.03	<0.03			<0.03
LEAD (PB) DIS	0.02	<0.01	<0.01	<0.01		<0.01
MANGANESE (MN) DIS	<0.01	<0.01				
MERCURY (HG) DIS	<0.001	<0.001	<0.001	<0.001		<0.001
NICKEL (NI) DIS			<0.01	<0.01		<0.01
SELENIUM (SE) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
SILVER (AG) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
THALLIUM (TL) DIS			<0.1	<0.1		<0.1
TIN (SN) DIS				<0.1		
VANADIUM (V) DIS			<0.1	<0.1		<0.1
ZINC (ZN) DIS			0.08	0.09		<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYLCYANIDE				<0.02		
ALLYLCHLORIDE 3-CHLORO-1-PROPENE				<0.001		
1,1,1,2-TETRACHLOROETHANE			<0.001	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.004	0.0038	0.0025	<0.001	0.0038	0.0041
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0027	0.0027	0.0017	0.0024	0.0024	0.0028
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE				<0.001		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS	DUPLICATE					
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103
-- VOLATILE ORGANICS --						
1,2-DIBROMOETHANE			<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE			<0.001	<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE				<0.001		
2-CHLOROETHYL VINYL ETHER	<0.001	<0.001				
2-HEXANONE			<0.02	<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01				
ACETONE			<0.02	<0.05	<0.05	<0.05
ACROLEIN				<0.02		
ACRYLONITRILE			<0.02	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0043	0.0044	0.0034	0.0035	0.0032	0.0035
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE				<0.001		
CIS-1,2-DICHLOROETHENE			<0.001	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.003	0.0032	0.0015	0.0024	0.0028	0.0038
ETHYL METHACRYLATE	<0.001	<0.001		<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ISOBUTANOL				<0.05		
TOTAL XYLENE	<0.001	<0.001				
M-P XYLENE			<0.001			
O-XYLENE			<0.001	<0.001	<0.001	<0.001
METHACRYLONITRILE				<0.02		
METHYL ETHYL KETONE				<0.02	<0.02	
METHYL ETHYL KETONE			<0.02			<0.02
METHYL ISOBUTYL KETONE			<0.02	<0.02	<0.02	<0.02
METHYL METHACRYLATE				<0.002		
METHYLENE CHLORIDE	0.0018	0.0019	0.0015	0.0021	<0.001	<0.001
PROPIONITRILE ETHYL CYANIDE				<0.02		
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.013	0.013	0.018	0.01	0.02	0.015
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0019	0.002	0.0013	0.0015	0.002	0.0018
TRICHLOROFLUOROMETHANE	0.002	0.0019	<0.001	0.0011	0.0014	0.0014
VINYL ACETATE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PICLORAM				<0.0005		
-- SEMI-VOLATILE EXTRACTABLES --						
ALPHA-CHLORDANE				<0.00005		
1,4-BENZENEDIAMINE				ND		
CHLOROBENZILATE				<0.01		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS		DUPLICATE				
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	
1,2,4,5-TETRACHLOROBENZENE				<0.01		
1,2,4-TRICHLOROBENZENE				<0.001		
1,2-DIBROMO-3-CHLOROPROPANE			<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE			<0.001	<0.001	<0.001	<0.001
1,3,5-TRINITROBENZENE				<0.01		
1,3-DICHLOROBENZENE				<0.001		
1,3-DICHLOROPROPANE				<0.001		
1,3-DINITROBENZENE				<0.01		
TRANS-1,4-DICHLORO-2-BUTENE			<0.002		<0.002	<0.002
1,4-DICHLORO-2-BUTENE				<0.002		
1,4-DICHLOROBENZENE			<0.001	<0.001	<0.001	<0.001
1,4-DIFLUOROBENZENE	<0.001	<0.001				
METHAPYRILENE				ND		
1-METHYLNAPHTHALENE				<0.01		
1-NAPHTHYLAMINE				<0.01		
2,3,4,6-TETRACHLOROPHENOL				<0.01		
2,4,5-TRICHLOROPHENOL				<0.01		
2,4,6-TRICHLOROPHENOL				<0.01		
2,4-DICHLOROPHENOL				<0.01		
2,4-DIMETHYLPHENOL				<0.01		
2,4-DINITROPHENOL				<0.05		
2,4-DINITROTOLUENE				<0.01		
2,6-DICHLOROPHENOL				<0.01		
2,6-DINITROTOLUENE				<0.01		
2-CHLORONAPHTHALENE				<0.01		
2-CHLOROPHENOL				<0.01		
2-METHYLNAPHTHALENE				<0.01		
2-METHYLPHENOL (O-CRESOL)				<0.01		
2-NAPHTHYLAMINE				<0.01		
2-NITROANILINE				<0.01		
2-NITROPHENOL				<0.01		
2-PICOLINE				<0.01		
3,3-DICHLOROBENZIDINE				<0.02		
3-METHYLCHOLANTHRENE				<0.1		
3-NITROANILINE				<0.01		
4,6-DINITRO-2-METHYLPHENOL				<0.05		
4-AMINOBIIPHENYL				<0.01		
4-BROMOPHENYL PHENYL ETHER				<0.01		
4-CHLORO-3-METHYLPHENOL				<0.01		
4-CHLORO-2-METHYLPHENOL				<0.01		
4-CHLOROPHENOL				<0.01		
4-CHLOROPHENYL PHENYL ETHER				<0.01		
4-METHYLPHENOL/3-METHYLPHENOL				<0.01		
4-NITROANILINE				<0.01		
4-NITROPHENOL				<0.0005		
7,12-DIMETHYLBENZENE (A) ANTHRACENE				<0.01		
A,A-DIMETHYLPHENETHYLAMINE				ND		
ACENAPHTHENE				<0.01		
ACENAPHTHYLENE				<0.01		
ACETOPHENONE				<0.01		
ANILINE				<0.01		
ANTHRACENE				<0.01		
ARAMITE				<0.01		
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)				<0.01		
BENZIDINE				<0.02		

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TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS		DUPLICATE				
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103

-- SEMI-VOLATILE EXTRACTABLES --

BENZO (A) ANTHRACENE	<0.01
BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHthalate	<0.01
DI-N-OCTYLPHthalate	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHthalate	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHthalate	<0.01
DINOSEB	<0.001
DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYClopentadiene	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPROPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1

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Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS	DUPLICATE					
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103

-- SEMI-VOLATILE EXTRACTABLES --

PARATHION	<0.01
PENTACHLOROBENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.00005
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIONAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001		
M+P-XYLENE		<0.001	<0.001
ACIFLOURFEN	<0.0005		
BENTAZON	<0.0025		
CHLORAMBEN	<0.0005		
DACTHAL	<0.001		
DALAPON	<0.01		
DICAMBA	<0.00025		
DICHLORPROP	<0.001		
AROCLOR 1016	<0.001		
AROCLOR 1221	<0.002		
AROCLOR 1232	<0.001		
AROCLOR 1242	<0.001		
AROCLOR 1248	<0.001		
AROCLOR 1254	<0.001		
AROCLOR 1260	<0.001		
AROCLOR 1262	<0.001		
AROCLOR 1268	<0.001		
2,4-D	<0.001		
2,4-DB	<0.0025		
DIALATE (AVADEX)	<0.01		
3,5-DICHLOROBEZOIC ACID	<0.0005		
DIMETHOATE (CYGON)	<0.1		
DISULFOTON	<0.01		
MCPA	<0.2		
MCP	<0.2		
METHYL PARATHION (PENNCAP-M)	<0.01		
PHORATE (THIMET)	<0.01		
SULFOTEP	<0.01		
2,4,5-T	<0.0002		
2,4,5-TP (SILVEX)	<0.0002		

-- OTHER PARAMETERS --

4;4'-DDD	<0.0001		
4;4'-DDE	<0.0001		
4;4'-DDT	<0.0001		
ALDRIN	<0.00005		
ALPHA-BHC	<0.00005		
BETA-BHC	<0.00005		
GAMMA-CHLORDANE	<0.00005		
CYANIDE (CN) TOT	<0.005	<0.005	<0.005
DELTA-BHC	<0.00005		

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Table 1. Summary of the data for the year 1991

Country	Area	Population	Urban population	Rural population	Population density	Urban population density	Rural population density
Algeria	2,381,471	10,500,000	4,500,000	6,000,000	44	185	19
Angola	483,477	10,000,000	4,000,000	6,000,000	207	425	102
Argentina	2,780,171	35,000,000	15,000,000	20,000,000	126	445	61
Australia	7,730,171	18,000,000	10,000,000	8,000,000	23	295	28
Austria	83,477	8,000,000	4,000,000	4,000,000	96	115	79
Bangladesh	143,477	100,000,000	40,000,000	60,000,000	1200	2400	600
Belgium	30,477	10,000,000	5,000,000	5,000,000	330	400	260
Brazil	8,430,171	150,000,000	70,000,000	80,000,000	17	205	21
Canada	9,970,171	30,000,000	15,000,000	15,000,000	3	35	3
Chad	127,477	10,000,000	4,000,000	6,000,000	78	155	78
China	9,597,171	1,200,000,000	400,000,000	800,000,000	120	240	60
Colombia	113,477	30,000,000	15,000,000	15,000,000	265	530	265
Czechia	78,477	10,000,000	5,000,000	5,000,000	128	158	128
Denmark	43,477	5,000,000	2,500,000	2,500,000	132	162	132
Egypt	100,477	50,000,000	20,000,000	30,000,000	50	100	50
France	643,477	60,000,000	30,000,000	30,000,000	90	110	90
Germany	357,477	80,000,000	40,000,000	40,000,000	235	285	235
Ghana	237,477	15,000,000	7,000,000	8,000,000	63	126	63
Greece	113,477	10,000,000	5,000,000	5,000,000	118	147	118
India	3,287,171	1,000,000,000	400,000,000	600,000,000	380	760	190
Indonesia	193,477	200,000,000	80,000,000	120,000,000	140	280	140
Italy	301,477	55,000,000	28,000,000	27,000,000	192	238	192
Japan	378,477	120,000,000	60,000,000	60,000,000	333	409	333
Kenya	225,477	20,000,000	10,000,000	10,000,000	89	177	89
Madagascar	593,477	10,000,000	4,000,000	6,000,000	17	34	17
Mali	124,477	10,000,000	4,000,000	6,000,000	80	160	80
Mexico	1,973,477	90,000,000	45,000,000	45,000,000	45	90	45
Morocco	446,477	25,000,000	12,000,000	13,000,000	56	112	56
Netherlands	41,477	15,000,000	7,500,000	7,500,000	354	439	354
Nigeria	373,477	100,000,000	40,000,000	60,000,000	268	535	268
Poland	313,477	35,000,000	18,000,000	17,000,000	111	138	111
Portugal	77,477	10,000,000	5,000,000	5,000,000	130	162	130
Romania	231,477	22,000,000	11,000,000	11,000,000	95	118	95
Russia	17,133,477	150,000,000	70,000,000	80,000,000	8	10	8
South Africa	121,477	25,000,000	12,000,000	13,000,000	206	411	206
Spain	505,477	40,000,000	20,000,000	20,000,000	79	158	79
Sweden	45,477	8,000,000	4,000,000	4,000,000	173	216	173
Switzerland	41,477	7,000,000	3,500,000	3,500,000	168	209	168
Tanzania	803,477	30,000,000	15,000,000	15,000,000	37	74	37
Thailand	513,477	60,000,000	30,000,000	30,000,000	115	230	115
Tunisia	130,477	9,000,000	4,500,000	4,500,000	69	138	69
USA	9,833,477	250,000,000	125,000,000	125,000,000	26	52	26
Yugoslavia	78,477	20,000,000	10,000,000	10,000,000	255	318	255

Sample Type: Monitoring Wells

SITE CODE	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1	HL-90-1
SAMPLE DATE	05/22/93	05/22/93	12/15/93	04/08/94	08/24/94	11/18/94
SAMPLE TIME	17:10	15:15	12:45	14:50	10:50	15:30
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	93-20280	93-20282	93-59622	94-13573	94-40099	94-58156
REMARKS		DUPLICATE				
SAMPLE NUMBER	HL-9305-102	HL-9305-112	HL-9312-102	HL-9404-102	HL-9408-101	HL-9411-103

-- OTHER PARAMETERS --

DIELDRIN				<0.0001		
ENDOSULFAN I				<0.00005		
ENDOSULFAN II				<0.0001		
ENDOSULFAN SULFATE				<0.0001		
ENDRIN				<0.0001		
ENDRIN ALDEHYDE				<0.0001		
ENDRIN KETONE				<0.0001		
GAMMA-BHC (LINDANE)				<0.00005		
HEPTACHLOR				<0.00005		
HEPTACHLOR EPOXIDE				<0.00005		
METHOXYCHLOR				<0.0005		
PRONAMIDE				<0.01		
SULFIDE AS S				<0.04		
CHEMICAL OXYGEN DEMAND	<1.0	<1.0	<1.0			4.0
TOXAPHENE				<0.005		

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1. (Continued)

1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000

Source: Bureau of Economic Analysis

1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000
10,000	10,000	10,000	10,000	10,000	10,000	10,000

10,000

10,000

10,000

10,000

10,000

Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

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Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

Source: Bureau of Economic Analysis

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	02/03/90	05/10/90	04/04/91	01/22/92	05/19/92	05/19/92	11/16/92
SAMPLE TIME	12:45	16:40	16:00	11:30	15:00	15:30	15:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2767	90-12197	91-12767	92-4686	92-19272	92-19273	92-49145
REMARKS						DUPLICATE	
SAMPLE NUMBER	HL90-2-102	HL-9005-120	HL-9104-104	HL-9201-104	HL-9205-101	HL-9205-119	HL-9211-104
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	46.15		47.55	56.55	50.15	50.15	48.54
PH (FLD)					7.7	7.7	7.09
PH	7.9		7.8	7.8	8.1	8.0	7.8
SC (UMHOS/CM AT 25 C)	877.0			815.0	841.0	826.0	796.0
SC (UMHOS/CM AT 25 C) (FLD)					830.0	830.0	818.0
TDS (MEASURED AT 180 C)	511.0		489.0	467.0	496.0	491.0	485.0
TOTAL SUSPENDED SOLIDS				146.0	4.0	4.0	32.0
WATER TEMPERATURE (C) (FLD)				9.0	11.3	11.3	8.7
-- MAJOR CONSTITUENTS --							
TOTAL HARDNESS AS CaCO3	444.0						
CALCIUM (CA) DIS	121.0		116.0	110.0	102.0	101.0	104.0
MAGNESIUM (MG) DIS	35.0		33.0	36.0	36.0	37.0	30.0
SODIUM (NA) DIS	23.0		25.0	28.0	27.0	28.0	24.0
POTASSIUM (K) DIS	3.0		3.0	5.0	4.0	3.0	3.0
TOTAL ALKALINITY AS CaCO3	367.0		351.0	350.0	364.0	357.0	344.0
BICARBONATE (HCO3)	448.0		428.0	427.0	444.0	436.0	420.0
CARBONATE AS CO3	0.0		0.0	0.0	0.0	0.0	0.0
SULFATE (SO4)	62.0		61.0	60.0	75.0	76.0	67.0
CHLORIDE (CL)	32.0		31.0	36.0	31.0	31.0	29.0
-- NUTRIENTS --							
AMMONIA (NH3 AS N)			<0.1	<0.1	<0.1	<0.1	0.1
NITRATE (NO3-N)					1.0	1.01	1.03
NITRATE + NITRITE AS N	0.9		0.83	0.96			
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS			<0.005	<0.005	<0.005	<0.005	<0.005
BARIUM (BA) DIS			<0.1	<0.1	<0.1	<0.1	<0.1
CADMIUM (CD) DIS	0.005		0.001	<0.001	<0.001	<0.001	<0.001
CHROMIUM (CR) DIS			<0.02	<0.02	<0.01	<0.01	<0.01
COPPER (CU) DIS	<0.01						
IRON (FE) DIS	0.06		0.12	0.07	0.11	0.11	0.12
LEAD (PB) DIS	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
MANGANESE (MN) DIS			<0.02	<0.02	<0.02	<0.02	<0.02
MERCURY (HG) DIS			<0.001	<0.001	<0.001	<0.001	<0.001
SELENIUM (SE) DIS			<0.005	<0.005	<0.005	<0.005	<0.005
SILVER (AG) DIS			<0.005	<0.005	<0.005	<0.005	<0.005
ZINC (ZN) DIS	0.02						
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE	<0.001						
1,1,1-TRICHLOROETHANE	0.002		0.001	0.00078	0.00099	0.00089	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0029		0.0022	0.0021	0.0022	0.002	0.0023
1,1-DICHLOROETHENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
1,1-DICHLOROPROPENE	<0.001						
1,2-DIBROMOETHANE	<0.001						
1,2-DICHLOROETHANE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
1,2-DICHLOROPROPANE	<0.001						
2,2-DICHLOROPROPANE	<0.001						
2-BUTANONE (METHYL-ETHYL-KETONE)			<0.01				
2-CHLOROETHYL VINYL ETHER			<0.01	<0.01	<0.01	<0.01	<0.001
2-CHLOROTOLUENE	<0.001						
2-HEXANONE			<0.01				

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	02/03/90	05/10/90	04/04/91	01/22/92	05/19/92	05/19/92	11/16/92
SAMPLE TIME	12:45	16:40	16:00	11:30	15:00	15:30	15:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2767	90-12197	91-12767	92-4686	92-19272	92-19273	92-49145
REMARKS						DUPLICATE	
SAMPLE NUMBER	HL90-2-102	HL-9005-120	HL-9104-104	HL-9201-104	HL-9205-101	HL-9205-119	HL-9211-104
-- VOLATILE ORGANICS --							
4-BROMOFLUOROBENZENE			<0.01	<0.01	<0.01	<0.01	<0.01
4-CHLOROTOLUENE	<0.001						
4-METHYL-2-PENTANONE			<0.01				
ACETONE			<0.01				
ACROLEIN			<0.01				
ACRYLONITRILE			<0.01				
BENZENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
BROMOBENZENE	<0.001						
BROMOCHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.01				
CARBON TETRACHLORIDE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CHLOROBENZENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CHLORMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001						
CIS-1,3-DICHLOROPROPENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0056		<0.001	<0.001	0.0018	0.0017	<0.001
ETHANOL			<0.01				
ETHYL METHACRYLATE			<0.01	<0.01	<0.01	<0.01	<0.001
ETHYLBENZENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE			<0.01	<0.01	<0.01	<0.01	<0.001
TOTAL XYLENE			<0.001	<0.001	<0.001	<0.001	<0.001
M-XYLENE	<0.001						
O-XYLENE	<0.001						
P-XYLENE	<0.001						
METHYLENE CHLORIDE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
TOLUENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
TRICHLOROFLUOROMETHANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE			<0.01	<0.01	<0.01	<0.01	<0.02
VINYL CHLORIDE	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROBENZENE	<0.001						
1,2,3-TRICHLOROPROPANE	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.01					
1,2,4-TRIMETHYLBENZENE	<0.001						
1,2-DIBROMO-3-CHLOROPROPANE	<0.001						
1,2-DICHLOROBENZENE	<0.001	<0.01					
1,3,5-TRIMETHYLBENZENE	<0.001						
1,3-DICHLOROBENZENE	<0.001	<0.01					
1,3-DICHLOROPROPANE	<0.001						
1,4-DICHLORO-2-BUTENE			<0.01				
1,4-DICHLOROBENZENE	<0.0005	<0.01					
1,4-DIFLUOROBENZENE			<0.01	<0.01	<0.01	<0.01	<0.001
2-METHYL-4,6-DINITROPHENOL		<0.05					

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	02/03/90	05/10/90	04/04/91	01/22/92	05/19/92	05/19/92	11/16/92
SAMPLE TIME	12:45	16:40	16:00	11:30	15:00	15:30	15:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2767	90-12197	91-12767	92-4686	92-19272	92-19273	92-49145
REMARKS						DUPLICATE	
SAMPLE NUMBER	HL90-2-102	HL-9005-120	HL-9104-104	HL-9201-104	HL-9205-101	HL-9205-119	HL-9211-104

-- SEMI-VOLATILE EXTRACTABLES --

2,4,6-TRICHLOROPHENOL		<0.01
2,4-DICHLOROPHENOL		<0.01
2,4-DIMETHYLPHENOL		<0.01
2,4-DINITROPHENOL		<0.05
2,4-DINITROTOLUENE		<0.01
2,6-DINITROTOLUENE		<0.01
2-CHLORONAPHTHALENE		<0.01
2-CHLOROPHENOL		<0.01
2-NITROPHENOL		<0.01
3,3-DICHLOROBENZIDINE		<0.01
4-BROMOPHENYL PHENYL ETHER		<0.01
4-CHLORO-3-METHYLPHENOL		<0.01
4-CHLOROPHENYL PHENYL ETHER		<0.01
4-NITROPHENOL		<0.05
ACENAPHTHENE		<0.01
ACENAPHTHYLENE		<0.01
ANTHRACENE		<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)		<0.01
BENZIDINE		<0.01
BENZO (A) ANTHRACENE		<0.01
BENZO (A) PYRENE		<0.01
BENZO (B) FLUORANTHENE		<0.01
BENZO (GHI) PERYLENE		<0.01
BENZO (K) FLUORANTHENE		<0.01
BIS (2-CHLOROETHOXY) METHANE		<0.01
BIS (2-CHLOROETHYL) ETHER		<0.01
BIS (2-CHLOROISOPROPYL) ETHER		<0.01
BIS (2-ETHYLHEXYL) PHTHALATE		<0.01
BUTYL BENZYL PHTHALATE		<0.01
CHRYSENE		<0.01
DI-N-BUTYLPHTHALATE		<0.01
DI-N-OCTYLPHTHALATE		<0.01
DIBENZO (A,H) ANTHRACENE		<0.01
DICHLOROMONOFUOROMETHANE	0.0034	
DIETHYLPHTHALATE		<0.01
DIMETHYLPHTHALATE		<0.01
FLUORANTHENE		<0.01
FLUORENE		<0.01
HEXACHLOROBENZENE		<0.01
HEXACHLOROBUTADIENE	<0.001	<0.01
HEXACHLOROETHANE		<0.01
INDENO (1,2,3-CD) PYRENE		<0.01
ISOPHORONE		<0.01
ISOPROPYLBENZENE	<0.001	
N-BUTYLBENZENE	<0.001	
N-NITROSO-DI-N-PROPYLAMINE		<0.01
N-NITROSOPHENYLAMINE		<0.01
N-PROPYLBENZENE	<0.001	
NAPHTHALENE	<0.001	<0.01
NITROBENZENE		<0.01
P-ISOPROPYLTOLUENE	<0.001	
PENTACHLOROPHENOL		<0.05
PHENANTHRENE		<0.01
PHENOL		<0.01
PYRENE		<0.01
SEC-BUTYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	02/03/90	05/10/90	04/04/91	01/22/92	05/19/92	05/19/92	11/16/92
SAMPLE TIME	12:45	16:40	16:00	11:30	15:00	15:30	15:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2767	90-12197	91-12767	92-4686	92-19272	92-19273	92-49145
REMARKS						DUPLICATE	
SAMPLE NUMBER	HL90-2-102	HL-9005-120	HL-9104-104	HL-9201-104	HL-9205-101	HL-9205-119	HL-9211-104

-- SEMI-VOLATILE EXTRACTABLES --

TERT-BUTYLBENZENE

<0.001

-- HYDROCARBONS --

TOTAL ORGANIC CARBON

2.0

-- OTHER PARAMETERS --

CYANIDE (CN) TOT

<0.005

<0.005

<0.005

<0.005

<0.005

CHEMICAL OXYGEN DEMAND

<1.0

2.0

1.0

2.0

8.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1. The Quality of the Data from the 1990 Census

Variable	1990 Census	1980 Census	1970 Census	1960 Census	1950 Census	1940 Census	1930 Census
Age	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Sex	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Marital Status	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Occupation	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Education	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Income	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Health	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Religion	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Place of Birth	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Place of Residence	95.0	95.0	95.0	95.0	95.0	95.0	95.0

Source: U.S. Census Bureau, 1990 Census of the United States, Summary Files 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

1990 Census: 95.0, 1980 Census: 95.0, 1970 Census: 95.0, 1960 Census: 95.0, 1950 Census: 95.0, 1940 Census: 95.0, 1930 Census: 95.0.

The quality of the data from the 1990 Census is generally high, with most variables having a coverage rate of 95.0 percent or higher. The only variables with lower coverage rates are Age (90.0 percent), Sex (90.0 percent), Marital Status (90.0 percent), Occupation (90.0 percent), Education (90.0 percent), Income (90.0 percent), Health (90.0 percent), Religion (90.0 percent), Place of Birth (90.0 percent), and Place of Residence (90.0 percent). The coverage rate for these variables is generally lower than for the other variables, but it is still high enough to ensure that the data are reliable for most purposes. The quality of the data from the 1990 Census is generally high, with most variables having a coverage rate of 95.0 percent or higher. The only variables with lower coverage rates are Age (90.0 percent), Sex (90.0 percent), Marital Status (90.0 percent), Occupation (90.0 percent), Education (90.0 percent), Income (90.0 percent), Health (90.0 percent), Religion (90.0 percent), Place of Birth (90.0 percent), and Place of Residence (90.0 percent). The coverage rate for these variables is generally lower than for the other variables, but it is still high enough to ensure that the data are reliable for most purposes.

Source: U.S. Census Bureau, 1990 Census of the United States, Summary Files 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	08/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	48.54	47.47	44.04	44.04	45.04	45.04	48.79
PH (FLD)	7.09	7.42	7.79	7.79	7.38	7.38	7.78
PH	7.8	7.8	7.6	7.5			
SC (UMHOS/CM AT 25 C)	796.0	796.0	851.0	862.0			
SC (UMHOS/CM AT 25 C) (FLD)	818.0	787.0	895.0	895.0	834.0	834.0	756.0
TDS (MEASURED AT 180 C)	498.0	481.0					
TOTAL SUSPENDED SOLIDS	32.0	38.0					
WATER TEMPERATURE (C) (FLD)	8.7	11.1	8.3	8.3	8.4	8.4	12.5
-- MAJOR CONSTITUENTS --							
CALCIUM (CA) DIS	103.0	103.0					
MAGNESIUM (MG) DIS	30.0	32.0					
SODIUM (NA) DIS	24.0	27.0					
POTASSIUM (K) DIS	3.0	3.0					
TOTAL ALKALINITY AS CaCO3	340.0	335.0					
BICARBONATE (HCO3)	415.0	409.0					
CARBONATE AS CO3	0.0	0.0					
SULFATE (SO4)	66.0	63.0	63.0	63.0			
CHLORIDE (CL)	29.0	25.0	28.0	28.0			
-- NUTRIENTS --							
AMMONIA (NH3 AS N)	<0.1	0.1					
NITRATE (NO3-N)	0.99	0.81	1.1	1.1			
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) DIS			<0.05	<0.05	<0.05	<0.05	
ARSENIC (AS) DIS	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
BARIUM (BA) DIS	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
BERYLLIUM (BE) DIS			<0.001	<0.001	<0.001	<0.001	
CADMIUM (CD) DIS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
COBALT (CO) DIS			<0.01	<0.01	<0.01	<0.01	
COPPER (CU) DIS			<0.01	<0.01	<0.01	<0.01	
IRON (FE) DIS	0.12	0.14	0.08	0.08			
LEAD (PB) DIS	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
MANGANESE (MN) DIS	<0.02	0.01					
MERCURY (HG) DIS	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
NICKEL (NI) DIS			<0.01	<0.01	<0.01	<0.01	
SELENIUM (SE) DIS	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
SILVER (AG) DIS	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
THALLIUM (TL) DIS			<0.1	<0.1	<0.1	<0.1	
TIN (SN) DIS					<0.1	<0.1	
VANADIUM (V) DIS			<0.1	<0.1	<0.1	<0.1	
ZINC (ZN) DIS			0.02	0.02	0.15	0.13	
-- VOLATILE ORGANICS --							
ACETONITRILE METHYLCYANIDE					<0.02	<0.02	
ALLYLCHLORIDE 3-CHLORO-1-PROPENE					<0.001	<0.001	
1,1,1,2-TETRACHLOROETHANE			<0.001	<0.001	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	0.001	0.0011	<0.001	<0.001	0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0026	<0.001	0.0014	0.0018	0.003	0.0032	0.0021
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE					<0.001	<0.001	
1,2-DIBROMOETHANE			<0.001	<0.001	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	08/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102
-- VOLATILE ORGANICS --							
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE			<0.001	<0.001	<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE					<0.001	<0.001	
2-CHLOROETHYL VINYL ETHER	<0.001	<0.001					
2-HEXANONE			<0.02	<0.02	<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01					
ACETONE			<0.02	<0.02	<0.05	<0.05	<0.05
ACROLEIN					<0.02	<0.02	
ACRYLONITRILE			<0.02	<0.02	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.001	<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	0.0026	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE					<0.001	<0.001	
CIS-1,2-DICHLOROETHENE			<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	0.0011	0.0013	<0.001
ETHYL METHACRYLATE	<0.001	<0.001			<0.001	<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ISOBUTANOL					<0.05	<0.05	
TOTAL XYLENE	<0.001	<0.001					
M-P XYLENE			<0.001	<0.001			
O-XYLENE			<0.001	<0.001	<0.001	<0.001	<0.001
METHACRYLONITRILE					<0.02	<0.02	<0.02
METHYL ETHYL KETONE					<0.02	<0.02	<0.02
METHYL ETHYL KETONE			<0.02	<0.02			
METHYL ISOBUTYL KETONE			<0.02	<0.02			
METHYL METHACRYLATE					<0.002	<0.002	<0.002
METHYLENE CHLORIDE	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE					<0.02	<0.02	
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PICLORAM					<0.0005	<0.0005	
-- SEMI-VOLATILE EXTRACTABLES --							
ALPHA-CHLORDANE					<0.00005	<0.00005	
1,4-BENZENEDIAMINE					ND	ND	
CHLOROBENZILATE					<0.01	<0.01	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	08/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102

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-- SEMI-VOLATILE EXTRACTABLES --
1,2,4,5-TETRACHLOROBENZENE                <0.01      <0.01
1,2,4-TRICHLOROBENZENE                    <0.001     <0.001
1,2-DIBROMO-3-CHLOROPROPANE                <0.001     <0.001     <0.001     <0.001
1,2-DICHLOROBENZENE                        <0.001     <0.001     <0.001     <0.001
1,3,5-TRINITROBENZENE                      <0.01      <0.01
1,3-DICHLOROBENZENE                        <0.001     <0.001
1,3-DICHLOROPROPANE                        <0.001     <0.001
1,3-DINITROBENZENE                          <0.01      <0.01
TRANS-1,4-DICHLORO-2-BUTENE                 <0.002     <0.002
1,4-DICHLORO-2-BUTENE                      <0.002     <0.002
1,4-DICHLOROBENZENE                        <0.001     <0.001     <0.001     <0.001
1,4-DIFLUOROBENZENE                        <0.001     <0.001
METHAPYRILENE                              ND          ND
1-METHYLNAPHTHALENE                       <0.01      <0.01
1-NAPHTHYLAMINE                           <0.01      <0.01
2,3,4,6-TETRACHLOROPHENOL                  <0.01      <0.01
2,4,5-TRICHLOROPHENOL                     <0.01      <0.01
2,4,6-TRICHLOROPHENOL                     <0.01      <0.01
2,4-DICHLOROPHENOL                         <0.01      <0.01
2,4-DIMETHYLPHENOL                         <0.01      <0.01
2,4-DINITROPHENOL                          <0.05      <0.05
2,4-DINITROTOLUENE                         <0.01      <0.01
2,6-DICHLOROPHENOL                         <0.01      <0.01
2,6-DINITROTOLUENE                         <0.01      <0.01
2-CHLORONAPHTHALENE                       <0.01      <0.01
2-CHLOROPHENOL                             <0.01      <0.01
2-METHYLNAPHTHALENE                       <0.01      <0.01
2-METHYLPHENOL (O-CRESOL)                  <0.01      <0.01
2-NAPHTHYLAMINE                           <0.01      <0.01
2-NITROANILINE                             <0.01      <0.01
2-NITROPHENOL                             <0.01      <0.01
2-PICOLINE                                <0.01      <0.01
3,3-DICHLOROBENZIDINE                      <0.02      <0.02
3-METHYLCHOLANTHRENE                       <0.1        <0.1
3-NITROANILINE                             <0.01      <0.01
4,6-DINITRO-2-METHYLPHENOL                 <0.05      <0.05
4-AMINOBIIPHENYL                           <0.01      <0.01
4-BROMOPHENYL PHENYL ETHER                  <0.01      <0.01
4-CHLORO-3-METHYLPHENOL                     <0.01      <0.01
4-CHLORO-2-METHYLPHENOL                     <0.01      <0.01
4-CHLOROPHENOL                             <0.01      <0.01
4-CHLOROPHENYL PHENYL ETHER                 <0.01      <0.01
4-METHYLPHENOL/3-METHYLPHENOL               <0.01      <0.01
4-NITROANILINE                             <0.01      <0.01
4-NITROPHENOL                             <0.0005     <0.0005
7,12-DIMETHYLBENZENE (A) ANTHRACENE         <0.01      <0.01
A,A-DIMETHYLPHENETHYLAMINE                 ND          ND
ACENAPHTHENE                               <0.01      <0.01
ACENAPHTHYLENE                             <0.01      <0.01
ACETOPHENONE                               <0.01      <0.01
ANILINE                                     <0.01      <0.01
ANTHRACENE                                 <0.01      <0.01
ARAMITE                                    <0.01      <0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)         <0.01      <0.01
BENZIDINE                                  <0.02      <0.02
BENZO (A) ANTHRACENE                       <0.01      <0.01
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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	03/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102

-- SEMI-VOLATILE EXTRACTABLES --

BENZO (A) PYRENE					<0.01	<0.01
BENZO (B) FLUORANTHENE					<0.01	<0.01
BENZO (GHI) PERYLENE					<0.01	<0.01
BENZO (K) FLUORANTHENE					<0.01	<0.01
BENZYL ALCOHOL					<0.01	<0.01
BIS (2-CHLOROETHOXY) METHANE					<0.01	<0.01
BIS (2-CHLOROETHYL) ETHER					<0.01	<0.01
BIS (2-CHLOROISOPROPYL) ETHER					<0.01	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE					<0.01	<0.01
BUTYL BENZYL PHTHALATE					<0.01	<0.01
CHRYSENE					<0.01	<0.01
DI-N-BUTYLPHTHALATE					<0.01	<0.01
DI-N-OCTYLPHTHALATE					<0.01	<0.01
DIBENZO (A,H) ANTHRACENE					<0.01	<0.01
DIBENZOFURAN					<0.01	<0.01
DIETHYLPHTHALATE					<0.01	<0.01
3,3'-DIMETHYLBENZIDINE					<0.01	<0.01
DIMETHYLPHTHALATE					<0.01	<0.01
DIOSEB					<0.001	<0.001
DIPHENYLAMINE					<0.01	<0.01
ETHYL METHANESULFONATE					<0.01	<0.01
FAMPHUR					<0.01	<0.01
FLUORANTHENE					<0.01	<0.01
FLUORENE					<0.01	<0.01
2-ACETYL AMINO FLUORENE					<0.01	<0.01
HEXACHLOROBENZENE					<0.01	<0.01
HEXACHLOROBUTADIENE					<0.001	<0.001
HEXACHLOROCYCLOPENTADIENE					<0.01	<0.01
HEXACHLOROETHANE					<0.01	<0.01
HEXACHLOROPHENE					ND	ND
HEXACHLOROPHROPENE					<0.01	<0.01
INDENO (1,2,3-CD) PYRENE					<0.01	<0.01
ISODRIN					<0.0001	<0.0001
ISOPHORONE					<0.01	<0.01
KEPONE					<0.001	<0.001
ISOSAFROLE					<0.01	<0.01
METHYL METHANESULFONATE					<0.01	<0.01
5-NITRO-O-TOLUIDINE					<0.01	<0.01
N-NITROSO-DI-N-BUTYLAMINE					<0.01	<0.01
N-NITROSO-DI-N-PROPYLAMINE					<0.01	<0.01
N-NITROSODIMETHYLAMINE					<0.01	<0.01
N-NITROSODIPHENYLAMINE					<0.01	<0.01
N-NITROSOPIPERIDINE					<0.01	<0.01
N-NITROSODIETHYLAMINE					<0.01	<0.01
N-NITROSOPYRROLIDINE					<0.01	<0.01
O-TOLUIDINE					<0.01	<0.01
N-NITROSMORPHOLINE					<0.01	<0.01
N-NITROSOMETHYLETHYLAMINE					<0.01	<0.01
NAPHTHALENE			<0.001	<0.001	<0.001	<0.001
NITROBENZENE					<0.01	<0.01
4-NITROQUINOLINE-N-OXIDE					<0.1	<0.1
P-CHLOROTOLUENE					<0.01	<0.01
P-CHLOROANILINE					<0.01	<0.01
P-DIMETHYLAMINOAZOBENZENE					<0.01	<0.01
1,4-NAPHTHOQUINONE					<0.1	<0.1
PARATHION					<0.01	<0.01

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	08/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102

-- SEMI-VOLATILE EXTRACTABLES --

PENTACHLOROBENZENE		<0.01	<0.01
PENTACHLORONITROBENZENE		<0.01	<0.01
PENTACHLOROPHENOL		<0.00005	<0.00005
PHENACETIN		<0.01	<0.01
PHENANTHRENE		<0.01	<0.01
PHENOL		<0.01	<0.01
O,O,O-TRIETHYLPHOSPHOROTHICATE		<0.001	<0.01
PYRENE		<0.01	<0.01
PYRIDINE		<0.02	<0.02
SAFROLE		<0.01	<0.01
THIONAZIN		<0.01	<0.01

-- HYDROCARBONS --

M+P-XYLENE		<0.001	<0.001	
M+P-XYLENE				<0.001
ACIFLOURFEN		<0.0005	<0.0005	
BENTAZON		<0.0025	<0.0025	
CHLORAMBEN		<0.0005	<0.0005	
DACTHAL		<0.001	<0.001	
DALAPON		<0.01	<0.01	
DICAMBA		<0.00025	<0.00025	
DICHLORPROP		<0.001	<0.001	
AROCLOR 1016		<0.001	<0.001	
AROCLOR 1221		<0.002	<0.002	
AROCLOR 1232		<0.001	<0.001	
AROCLOR 1242		<0.001	<0.001	
AROCLOR 1248		<0.001	<0.001	
AROCLOR 1254		<0.001	<0.001	
AROCLOR 1260		<0.001	<0.001	
AROCLOR 1262		<0.001	<0.001	
AROCLOR 1268		<0.001	<0.001	
2,4-D		<0.001	<0.001	
2,4-DB		<0.0025	<0.0025	
DIALATE (AVADEX)		<0.01	<0.01	
3,5-DICHLOROBEOIC ACID		<0.0005	<0.0005	
DIMETHOATE (CYGON)		<0.1	<0.1	
DISULFOTON		<0.01	<0.01	
MCPA		<0.2	<0.2	
MCP		<0.2	<0.2	
METHYL PARATHION (PENNCAP-M)		<0.01	<0.01	
PHORATE (THIMET)		<0.01	<0.01	
SULFOTEP		<0.01	<0.01	
2,4,5-T		<0.0002	<0.0002	
2,4,5-TP (SILVEX)		<0.0002	<0.0002	

-- OTHER PARAMETERS --

4;4'-DDD		<0.0001	<0.0001
4;4'-DDE		<0.0001	<0.0001
4;4'-DDT		<0.0001	<0.0001
ALDRIN		<0.00005	<0.00005
ALPHA-BHC		<0.00005	<0.00005
BETA-BHC		<0.00005	<0.00005
GAMMA-CHLORDANE		<0.00005	<0.00005
CYANIDE (CN) TOT	<0.005	<0.005	<0.005
DELTA-BHC		<0.00005	<0.00005
DIELDRIN		<0.0001	<0.0001

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SITE CODE	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2	HL-90-2
SAMPLE DATE	11/16/92	05/22/93	12/16/93	12/16/93	04/07/94	04/07/94	08/24/94
SAMPLE TIME	15:55	16:00	09:45	08:30	14:30	20:30	10:30
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-49146	93-20279	93-59626	93-59628	94-13574	94-13579	94-40100
REMARKS	DUPLICATE			DUPLICATE		DUPLICATE	
SAMPLE NUMBER	HL-9211-105	HL-9305-103	HL-9312-103	HL-9312-110	HL-9404-103	HL-9404-108	HL-9408-102

-- OTHER PARAMETERS --

ENDOSULFAN I					<0.00005	<0.00005	
ENDOSULFAN II					<0.0001	<0.0001	
ENDOSULFAN SULFATE					<0.0001	<0.0001	
ENDRIN					<0.0001	<0.0001	
ENDRIN ALDEHYDE					<0.0001	<0.0001	
ENDRIN KETONE					<0.0001	<0.0001	
GAMMA-BHC (LINDANE)					<0.00005	<0.00005	
HEPTACHLOR					<0.00005	<0.00005	
HEPTACHLOR EPOXIDE					<0.00005	<0.00005	
METHOXYCHLOR					<0.0005	<0.0005	
PRONAMIDE					<0.01	<0.01	
SULFIDE AS S					<0.04	<0.04	
CHEMICAL OXYGEN DEMAND	8.0	<1.0	<1.0	<1.0			
TOXAPHENE					<0.005	<0.005	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Sample Type: Monitoring Wells

SITE CODE	HL-90-2
SAMPLE DATE	11/18/94
SAMPLE TIME	16:25
LAB	EL
LAB NUMBER	94-58157
SAMPLE NUMBER	HL-9411-104

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	46.66
PH (FLD)	7.75
PH	7.6
SC (UMHOS/CM AT 25 C)	765.0
SC (UMHOS/CM AT 25 C) (FLD)	765.0
WATER TEMPERATURE (C) (FLD)	8.3

-- MAJOR CONSTITUENTS --

SULFATE (SO4)	50.0
CHLORIDE (CL)	28.0

-- NUTRIENTS --

NITRATE + NITRITE AS N	1.06
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05
ARSENIC (AS) DIS	<0.005
BARIUM (BA) DIS	<0.1
BERYLLIUM (BE) DIS	<0.001
CADMIUM (CD) DIS	<0.001
CHROMIUM (CR) DIS	<0.01
COBALT (CO) DIS	<0.01
COPPER (CU) DIS	<0.01
IRON (FE) DIS	0.03
LEAD (PB) DIS	<0.01
MERCURY (HG) DIS	<0.001
NICKEL (NI) DIS	<0.01
SELENIUM (SE) DIS	<0.005
SILVER (AG) DIS	<0.005
THALLIUM (TL) DIS	<0.1
VANADIUM (V) DIS	<0.1
ZINC (ZN) DIS	<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	0.0022
1,1-DICHLOROETHENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.001
1,2-DICHLOROPROPANE	<0.001
2-HEXANONE	<0.02
ACETONE	<0.05
ACRYLONITRILE	<0.02
BENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON DISULFIDE	<0.001
CARBON TETRACHLORIDE	<0.001
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	<0.001
CHLOROMETHANE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

ARMY GLOSSARY

1-1000
1-1001
1-1002
1-1003
1-1004
1-1005

1-1006
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1-1012
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1-1015
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2-1000

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3-1100

Sample Type: Monitoring Wells

SITE CODE HL-90-2
 SAMPLE DATE 11/18/94
 SAMPLE TIME 16:25
 LAB EL
 LAB NUMBER 94-58157
 SAMPLE NUMBER HL-9411-104

-- VOLATILE ORGANICS --

CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 IODOMETHANE <0.001
 O-XYLENE <0.001
 METHYL ETHYL KETONE <0.02
 METHYL ISOBUTYL KETONE <0.02
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.001
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.001
 TRICHLOROFLUOROMETHANE <0.001
 VINYL ACETATE <0.001
 VINYL CHLORIDE <0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 TRANS-1,4-DICHLORO-2-BUTENE <0.002
 1,4-DICHLOROBENZENE <0.001

-- HYDROCARBONS --

M+P-XYLENE <0.001

-- OTHER PARAMETERS --

CYANIDE (CN) TOT <0.005
 CHEMICAL OXYGEN DEMAND 5.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	02/02/90	04/05/91	01/21/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	14:30	14:30	14:00	10:30	13:15	14:30	14:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2765	91-12770	92-4683	92-19269	92-49142	93-20283	93-59623
SAMPLE NUMBER	HL-90-2-100	HL-9104-107	HL-9201-100	HL-9205-109	HL-9211-101	HL-9305-104	HL-9312-104

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	57.81	55.47	54.16	56.71	55.8	55.96	55.1
PH (FLD)				7.08	7.26	7.18	7.4
PH	7.5	7.7	7.5	7.9	7.5	7.3	7.2
SC (UMHOS/CM AT 25 C)	1130.0		963.0	1040.0	948.0	1000.0	1070.0
SC (UMHOS/CM AT 25 C) (FLD)				1000.0	985.0	999.0	1140.0
TDS (MEASURED AT 180 C)	686.0	662.0	642.0	626.0	633.0	644.0	
TOTAL SUSPENDED SOLIDS			1850.0	83.0	650.0	138.0	
WATER TEMPERATURE (C) (FLD)			10.0	12.4	10.1	10.8	10.0

-- MAJOR CONSTITUENTS --

TOTAL HARDNESS AS CaCO3	435.0						
CALCIUM (CA) DIS	109.0	108.0	95.0	93.0	81.0	92.0	
MAGNESIUM (MG) DIS	40.0	39.0	35.0	41.0	30.0	34.0	
SODIUM (NA) DIS	80.0	83.0	90.0	94.0	92.0	92.0	
POTASSIUM (K) DIS	3.0	4.0	4.0	2.0	3.0	3.0	
TOTAL ALKALINITY AS CaCO3	400.0	393.0	399.0	405.0	405.0	373.0	
BICARBONATE (HCO3)	488.0	479.0	487.0	494.0	494.0	455.0	
CARBONATE AS CO3	0.0	0.0	0.0	0.0	0.0	0.0	
SULFATE (SO4)	136.0	134.0	123.0	156.0	99.0	115.0	140.0
CHLORIDE (CL)	30.0	29.0	24.0	28.0	21.0	26.0	35.0

-- NUTRIENTS --

AMMONIA (NH3 AS N)			<0.1	<0.1	<0.1	<0.1	
NITRATE (NO3-N)					5.02	5.82	5.71
NITRATE + NITRITE AS N	5.7	6.91	6.3				
TOTAL NITROGEN AS N		<0.1		7.07			

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS							<0.05
ARSENIC (AS) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BARIUM (BA) DIS		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BERYLLIUM (BE) DIS							<0.001
CADMIUM (CD) DIS	0.006	0.002	0.001	<0.001	<0.001	<0.001	<0.001
CHROMIUM (CR) DIS		<0.02	<0.02	<0.01	<0.01	<0.01	<0.01
COBALT (CO) DIS							<0.01
COPPER (CU) DIS	<0.01						<0.01
IRON (FE) DIS	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
LEAD (PB) DIS	<0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.01
MANGANESE (MN) DIS		<0.02	<0.02	<0.02	<0.02	<0.01	
MERCURY (HG) DIS		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NICKEL (NI) DIS							<0.01
SELENIUM (SE) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SILVER (AG) DIS		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
THALLIUM (TL) DIS							<0.1
VANADIUM (V) DIS							<0.1
ZINC (ZN) DIS	0.02						0.11

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001						<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001						
1,2-DIBROMOETHANE	<0.001						<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	02/02/90	04/05/91	01/21/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	14:30	14:30	14:00	10:30	13:15	14:30	14:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2765	91-12770	92-4683	92-19269	92-49142	93-20283	93-59623
SAMPLE NUMBER	HL-90-2-100	HL-9104-107	HL-9201-100	HL-9205-109	HL-9211-101	HL-9305-104	HL-9312-104
-- VOLATILE ORGANICS --							
1,2-DICHLOROPROPANE	<0.001						<0.001
2,2-DICHLOROPROPANE	<0.001						
2-BUTANONE (METHYL-ETHYL-KETONE)		<0.01					
2-CHLOROETHYL VINYL ETHER		<0.01	<0.01	<0.01	<0.001	<0.001	
2-CHLOROTOLUENE	<0.001						
2-HEXANONE		<0.01					<0.02
4-BROMOFLUOROBENZENE		<0.01	<0.01	<0.01	<0.01	<0.01	
4-CHLOROTOLUENE	<0.001						
4-METHYL-2-PENTANONE		<0.01					
ACETONE		<0.01					<0.02
ACROLEIN		<0.01					
ACRYLONITRILE		<0.01					<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
BROMOBENZENE	<0.001						
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.01					<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0055	0.0058	0.0043	0.004	0.0038	0.0035	0.0036
CHLORMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	0.0018						0.0015
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHANOL		<0.01					
ETHYL METHACRYLATE		<0.01	<0.01	<0.01	<0.001	<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE		<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
TOTAL XYLENE		<0.001	<0.001	<0.001	<0.001	<0.001	
M-XYLENE	<0.001						
M-P XYLENE							<0.001
O-XYLENE	<0.001						<0.001
P-XYLENE	<0.001						
METHYL ETHYL KETONE							<0.02
METHYL ISOBUTYL KETONE							<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0026	0.0019	0.0011	0.0017	<0.001	0.0012	0.0014
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0006	0.00065	<0.0005	<0.0005	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE		<0.01	<0.01	<0.01	<0.02	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROBENZENE	<0.001						
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001						
1,2,4-TRIMETHYLBENZENE	<0.001						
1,2-DIBROMO-3-CHLOROPROPANE	<0.001						<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	02/02/90	04/05/91	01/21/92	05/19/92	11/16/92	05/22/93	12/15/93
SAMPLE TIME	14:30	14:30	14:00	10:30	13:15	14:30	14:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-2765	91-12770	92-4683	92-19269	92-49142	93-20283	93-59623
SAMPLE NUMBER	HL-90-2-100	HL-9104-107	HL-9201-100	HL-9205-109	HL-9211-101	HL-9305-104	HL-9312-104

-- SEMI-VOLATILE EXTRACTABLES --

1,2-DICHLOROBENZENE	<0.001						<0.001
1,3,5-TRIMETHYLBENZENE	<0.001						
1,3-DICHLOROBENZENE	<0.001						
1,3-DICHLOROPROPANE	<0.001						
TRANS-1,4-DICHLORO-2-BUTENE							<0.002
1,4-DICHLORO-2-BUTENE		<0.01					
1,4-DICHLOROBENZENE	<0.0005						<0.001
1,4-DIFLUOROBENZENE		<0.01	<0.01	<0.01	<0.001	<0.001	
DICHLOROMONOFUOROMETHANE	<0.001						
HEXACHLOROBUTADIENE	<0.001						
ISOPROPYLBENZENE	<0.001						
N-BUTYLBENZENE	<0.001						
N-PROPYLBENZENE	<0.001						
NAPHTHALENE	<0.001						<0.001
P-ISOPROPYLTOLUENE	<0.001						
SEC-BUTYLBENZENE	<0.001						
TERT-BUTYLBENZENE	<0.001						

-- HYDROCARBONS --

TOTAL ORGANIC CARBON		2.0					
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-- OTHER PARAMETERS --

CYANIDE (CN) TOT		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CHEMICAL OXYGEN DEMAND		3.0	10.0	14.0	12.0	<1.0	<1.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Summary of Results

1-1-35	2-1-35	3-1-35	4-1-35	5-1-35	6-1-35	7-1-35	8-1-35
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	04/07/94	08/24/94	11/18/94
SAMPLE TIME	16:30	12:00	13:00
LAB	EL	EL	EL
LAB NUMBER	94-13575	94-40101	94-58158
SAMPLE NUMBER	HL-9404-104	HL-9408-103	HL-9411-105

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	55.88	59.12	57.51
PH (FLD)	7.53	7.44	6.95
PH			7.3
SC (UMHOS/CM AT 25 C)			1010.0
SC (UMHOS/CM AT 25 C) (FLD)	1115.0	861.0	953.0
WATER TEMPERATURE (C) (FLD)	10.0	12.7	10.0

-- MAJOR CONSTITUENTS --

SULFATE (SO4)			118.0
CHLORIDE (CL)			28.0

-- NUTRIENTS --

NITRATE + NITRITE AS N			6.45
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05		<0.05
ARSENIC (AS) DIS	<0.005		<0.005
BARIUM (BA) DIS	0.1		<0.1
BERYLLIUM (BE) DIS	<0.001		<0.001
CADMIUM (CD) DIS	<0.001		<0.001
CHROMIUM (CR) DIS	<0.01		<0.01
COBALT (CO) DIS	<0.01		<0.01
COPPER (CU) DIS	<0.01		<0.01
IRON (FE) DIS			<0.03
LEAD (PB) DIS	<0.01		<0.01
MERCURY (HG) DIS	<0.001		<0.001
NICKEL (NI) DIS	<0.01		<0.01
SELENIUM (SE) DIS	<0.005		<0.005
SILVER (AG) DIS	<0.005		<0.005
THALLIUM (TL) DIS	<0.1		<0.1
TIN (SN) DIS	<0.1		
VANADIUM (V) DIS	<0.1		<0.1
ZINC (ZN) DIS	0.07		<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYLCYANIDE	<0.02		
ALLYLCHLORIDE 3-CHLORO-1-PROPENE	<0.001		
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001		
1,2-DIBROMOETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001		
2-HEXANONE	<0.02	<0.02	<0.02
ACETONE	<0.05	<0.05	<0.05
ACROLEIN	<0.02		
ACRYLONITRILE	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	04/07/94	08/24/94	11/18/94
SAMPLE TIME	16:30	12:00	13:00
LAB	EL	EL	EL
LAB NUMBER	94-13575	94-40101	94-58158
SAMPLE NUMBER	HL-9404-104	HL-9408-103	HL-9411-105

-- VOLATILE ORGANICS --

CARBON DISULFIDE	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	0.0047	0.0038	0.004
CHLOROMETHANE	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE	<0.001		
CIS-1,2-DICHLOROETHENE	0.0024	0.0013	0.0013
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001
ETHYL METHACRYLATE	<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001
ISOBUTANOL	<0.05		
O-XYLENE	<0.001	<0.001	<0.001
METHACRYLONITRILE	<0.02		
METHYL ETHYL KETONE	<0.02	<0.02	
METHYL ETHYL KETONE			<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02	<0.02
METHYL METHACRYLATE	<0.002		
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE	<0.02		
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0019	0.001	0.0013
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001
PICLORAM	<0.0005		

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE	<0.00005		
1,4-BENZENEDIAMINE	ND		
CHLOROBENZILATE	<0.01		
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE	<0.01		
1,2,4-TRICHLOROBENZENE	<0.001		
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001	<0.001
1,3,5-TRINITROBENZENE	<0.01		
1,3-DICHLOROBENZENE	<0.001		
1,3-DICHLOROPROPANE	<0.001		
1,3-DINITROBENZENE	<0.01		
TRANS-1,4-DICHLORO-2-BUTENE		<0.002	<0.002
1,4-DICHLORO-2-BUTENE	<0.002		
1,4-DICHLOROBENZENE	<0.001	<0.001	<0.001
METHAPYRILENE	ND		
1-METHYLNAPHTHALENE	<0.01		
1-NAPHTHYLAMINE	<0.01		
2,3,4,6-TETRACHLOROPHENOL	<0.01		
2,4,5-TRICHLOROPHENOL	<0.01		
2,4,6-TRICHLOROPHENOL	<0.01		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	04/07/94	08/24/94	11/18/94
SAMPLE TIME	16:30	12:00	13:00
LAB	EL	EL	EL
LAB NUMBER	94-13575	94-40101	94-58158
SAMPLE NUMBER	HL-9404-104	HL-9408-103	HL-9411-105

-- SEMI-VOLATILE EXTRACTABLES --

2,4-DICHLOROPHENOL	<0.01
2,4-DIMETHYLPHENOL	<0.01
2,4-DINITROPHENOL	<0.05
2,4-DINITROTOLUENE	<0.01
2,6-DICHLOROPHENOL	<0.01
2,6-DINITROTOLUENE	<0.01
2-CHLORONAPHTHALENE	<0.01
2-CHLOROPHENOL	<0.01
2-METHYLNAPHTHALENE	<0.01
2-METHYLPHENOL (O-CRESOL)	<0.01
2-NAPHTHYLAMINE	<0.01
2-NITROANILINE	<0.01
2-NITROPHENOL	<0.01
2-PICOLINE	<0.01
3,3-DICHLOROBENZIDINE	<0.02
3-METHYLCHOLANTHRENE	<0.1
3-NITROANILINE	<0.01
4,6-DINITRO-2-METHYLPHENOL	<0.05
4-AMINOBIOPHENYL	<0.01
4-BROMOPHENYL PHENYL ETHER	<0.01
4-CHLORO-3-METHYLPHENOL	<0.01
4-CHLORO-2-METHYLPHENOL	<0.01
4-CHLOROPHENOL	<0.01
4-CHLOROPHENYL PHENYL ETHER	<0.01
4-METHYLPHENOL/3-METHYLPHENOL	<0.01
4-NITROANILINE	<0.01
4-NITROPHENOL	<0.0005
12-DIMETHYLBENZENE (A) ANTHRACENE	<0.01
A,A-DIMETHYLPHENETHYLAMINE	ND
ACENAPHTHENE	<0.01
ACENAPHTHYLENE	<0.01
ACETOPHENONE	<0.01
ANILINE	<0.01
ANTHRACENE	<0.01
ARAMITE	<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	<0.01
BENZIDINE	<0.02
BENZO (A) ANTHRACENE	<0.01
BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DINOSEB	<0.001

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	04/07/94	08/24/94	11/18/94
SAMPLE TIME	16:30	12:00	13:00
LAB	EL	EL	EL
LAB NUMBER	94-13575	94-40101	94-58158
SAMPLE NUMBER	HL-9404-104	HL-9408-103	HL-9411-105

-- SEMI-VOLATILE EXTRACTABLES --

DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHOPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1
PARATHION	<0.01
PENTACHLOROBENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.00005
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIONAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001		
M+P-XYLENE		<0.001	<0.001
ACIFLOURFEN	<0.0005		
BENTAZON	<0.0025		
CHLORAMBEN	<0.0005		
DACTHAL	<0.001		
DALAPON	<0.01		

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Sample Type: Monitoring Wells

SITE CODE	HL-90-3	HL-90-3	HL-90-3
SAMPLE DATE	04/07/94	08/24/94	11/18/94
SAMPLE TIME	16:30	12:00	13:00
LAB	EL	EL	EL
LAB NUMBER	94-13575	94-40101	94-58158
SAMPLE NUMBER	HL-9404-104	HL-9408-103	HL-9411-105

-- HYDROCARBONS --

DICAMBA	<0.00025	
DICHLORPROP	<0.001	
AROCLOR 1016	<0.001	
AROCLOR 1221	<0.002	
AROCLOR 1232	<0.001	
AROCLOR 1242	<0.001	
AROCLOR 1248	<0.001	
AROCLOR 1254	<0.001	
AROCLOR 1260	<0.001	
AROCLOR 1262	<0.001	
AROCLOR 1268	<0.001	
2,4-D	<0.001	
2,4-DB	<0.0025	
DIALATE (AVADEX)	<0.01	
3,5-DICHLOROBEZOIC ACID	<0.0005	
DIMETHOATE (CYGON)	<0.1	
DISULFOTON	<0.01	
MCPA	<0.2	
MCPP	<0.2	
METHYL PARATHION (PENNCAP-M)	<0.01	
PHORATE (THIMET)	<0.01	
SULFOTEP	<0.01	
2,4,5-T	<0.0002	
2,4,5-TP (SILVEX)	<0.0002	

-- OTHER PARAMETERS --

4;4'-DDD	<0.0001	
4;4'-DDE	<0.0001	
4;4'-DDT	<0.0001	
ALDRIN	<0.00005	
ALPHA-BHC	<0.00005	
BETA-BHC	<0.00005	
GAMMA-CHLORDANE	<0.00005	
CYANIDE (CN) TOT	<0.005	<0.005
DELTA-BHC	<0.00005	
DIELDRIN	<0.0001	
ENDOSULFAN I	<0.00005	
ENDOSULFAN II	<0.0001	
ENDOSULFAN SULFATE	<0.0001	
ENDRIN	<0.0001	
ENDRIN ALDEHYDE	<0.0001	
ENDRIN KETONE	<0.0001	
GAMMA-BHC (LINDANE)	<0.00005	
HEPTACHLOR	<0.00005	
HEPTACHLOR EPOXIDE	<0.00005	
METHOXYCHLOR	<0.0005	
PRONAMIDE	<0.01	
SULFIDE AS S	<0.04	
CHEMICAL OXYGEN DEMAND		7.0
TOXAPHENE	<0.005	

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Sample Type: Monitoring Wells

SITE CODE	HL-94-1	HL-94-1
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	09:30	10:00
LAB	EL	EL
LAB NUMBER	94-13576	94-58159
SAMPLE NUMBER	HL-9404-105	HL-9411-106

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	53.32	53.38
PH (FLD)	7.67	7.19
PH		7.6
SC (UMHOS/CM AT 25 C)		848.0
SC (UMHOS/CM AT 25 C) (FLD)	907.0	837.0
WATER TEMPERATURE (C) (FLD)	9.7	9.1

-- MAJOR CONSTITUENTS --

SULFATE (SO4)		123.0
CHLORIDE (CL)		23.0

-- NUTRIENTS --

NITRATE + NITRITE AS N		7.38
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05	<0.05
ARSENIC (AS) DIS	<0.005	<0.005
BARIUM (BA) DIS	0.1	<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01
COBALT (CO) DIS	<0.01	<0.01
COPPER (CU) DIS	<0.01	<0.01
IRON (FE) DIS		<0.03
LEAD (PB) DIS	<0.01	<0.01
MERCURY (HG) DIS	<0.001	<0.001
NICKEL (NI) DIS	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	<0.005
SILVER (AG) DIS	<0.005	<0.005
THALLIUM (TL) DIS	<0.1	<0.1
TIN (SN) DIS	<0.1	
VANADIUM (V) DIS	<0.1	<0.1
ZINC (ZN) DIS	0.01	<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYLCYANIDE	<0.02	
ALLYLCHLORIDE 3-CHLORO-1-PROPENE	<0.001	
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACROLEIN	<0.02	
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-94-1	HL-94-1
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	09:30	10:00
LAB	EL	EL
LAB NUMBER	94-13576	94-58159
SAMPLE NUMBER	HL-9404-105	HL-9411-106

-- VOLATILE ORGANICS --

CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.0005
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.0042	0.0039
CHLOROMETHANE	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE	<0.001	
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYL METHACRYLATE	<0.001	
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
ISOBUTANOL	<0.05	
O-XYLENE	<0.001	<0.001
METHACRYLONITRILE	<0.02	
METHYL ETHYL KETONE	<0.02	
METHYL ETHYL KETONE		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYL METHACRYLATE	<0.002	
METHYLENE CHLORIDE	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE	<0.02	
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001
PICLORAM	<0.0005	

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE	<0.00005	
1,4-BENZENEDIAMINE	ND	
CHLOROBENZILATE	<0.01	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE	<0.01	
1,2,4-TRICHLOROBENZENE	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
1,3,5-TRINITROBENZENE	<0.01	
1,3-DICHLOROBENZENE	<0.001	
1,3-DICHLOROPROPANE	<0.001	
1,3-DINITROBENZENE	<0.01	
TRANS-1,4-DICHLORO-2-BUTENE		<0.002
1,4-DICHLORO-2-BUTENE	<0.002	
1,4-DICHLOROBENZENE	<0.001	<0.001
METHAPYRILENE	ND	
1-METHYLNAPHTHALENE	<0.01	
1-NAPHTHYLAMINE	<0.01	
2,3,4,6-TETRACHLOROPHENOL	<0.01	
2,4,5-TRICHLOROPHENOL	<0.01	
2,4,6-TRICHLOROPHENOL	<0.01	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	HL-94-1	HL-94-1
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	09:30	10:00
LAB	EL	EL
LAB NUMBER	94-13576	94-58159
SAMPLE NUMBER	HL-9404-105	HL-9411-106

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-- SEMI-VOLATILE EXTRACTABLES --
2,4-DICHLOROPHENOL      <0.01
2,4-DIMETHYLPHENOL      <0.01
2,4-DINITROPHENOL      <0.05
2,4-DINITROTOLUENE      <0.01
2,6-DICHLOROPHENOL      <0.01
2,6-DINITROTOLUENE      <0.01
2-CHLORONAPHTHALENE     <0.01
2-CHLOROPHENOL          <0.01
2-METHYLNAPHTHALENE     <0.01
2-METHYLPHENOL (O-CRESOL) <0.01
2-NAPHTHYLAMINE         <0.01
2-NITROANILINE          <0.01
2-NITROPHENOL           <0.01
2-PICOLINE              <0.01
3,3-DICHLOROBENZIDINE   <0.02
3-METHYLCHOLANTHRENE    <0.1
3-NITROANILINE          <0.01
4,6-DINITRO-2-METHYLPHENOL <0.05
4-AMINOBIIPHENYL        <0.01
4-BROMOPHENYL PHENYL ETHER <0.01
4-CHLORO-3-METHYLPHENOL <0.01
4-CHLORO-2-METHYLPHENOL <0.01
4-CHLOROPHENOL          <0.01
4-CHLOROPHENYL PHENYL ETHER <0.01
4-METHYLPHENOL/3-METHYLPHENOL <0.01
4-NITROANILINE          <0.01
4-NITROPHENOL           <0.0005
12-DIMETHYLBENZENE (A) ANTHRACENE <0.01
A,A-DIMETHYLPHENETHYLAMINE ND
ACENAPHTHENE            <0.01
ACENAPHTHYLENE          <0.01
ACETOPHENONE            <0.01
ANILINE                 <0.01
ANTHRACENE              <0.01
ARAMITE                 <0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE) <0.01
BENZIDINE               <0.02
BENZO (A) ANTHRACENE    <0.01
BENZO (A) PYRENE        <0.01
BENZO (B) FLUORANTHENE  <0.01
BENZO (GHI) PERYLENE    <0.01
BENZO (K) FLUORANTHENE  <0.01
BENZYL ALCOHOL          <0.01
BIS (2-CHLOROETHOXY) METHANE <0.01
BIS (2-CHLOROETHYL) ETHER <0.01
BIS (2-CHLOROISOPROPYL) ETHER <0.01
BIS (2-ETHYLHEXYL) PHTHALATE 0.01
BUTYL BENZYL PHTHALATE  <0.01
CHRYSENE                <0.01
DI-N-BUTYLPHTHALATE     <0.01
DI-N-OCTYLPHTHALATE     <0.01
DIBENZO (A,H) ANTHRACENE <0.01
DIBENZOFURAN            <0.01
DIETHYLPHTHALATE        <0.01
3,3'-DIMETHYLBENZIDINE  <0.01
DIMETHYLPHTHALATE       <0.01
DINOSEB                 <0.001
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Sample Type: Monitoring Wells

SITE CODE	HL-94-1	HL-94-1
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	09:30	10:00
LAB	EL	EL
LAB NUMBER	94-13576	94-58159
SAMPLE NUMBER	HL-9404-105	HL-9411-106

-- SEMI-VOLATILE EXTRACTABLES --

DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHOPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1
PARATHION	<0.01
PENTACHLOROBENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.00005
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIONAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001
M+P-XYLENE	<0.001
ACIFLOURFEN	<0.0005
BENTAZON	<0.0025
CHLORAMBEN	<0.0005
DACTHAL	<0.001
DALAPON	<0.01

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Sample Type: Monitoring Wells

SITE CODE	HL-94-1	HL-94-1
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	09:30	10:00
LAB	EL	EL
LAB NUMBER	94-13576	94-58159
SAMPLE NUMBER	HL-9404-105	HL-9411-106

-- HYDROCARBONS --

DICAMBA	<0.00025	
DICHLORPROP	<0.001	
AROCLOR 1016	<0.001	
AROCLOR 1221	<0.002	
AROCLOR 1232	<0.001	
AROCLOR 1242	<0.001	
AROCLOR 1248	<0.001	
AROCLOR 1254	<0.001	
AROCLOR 1260	<0.001	
AROCLOR 1262	<0.001	
AROCLOR 1268	<0.001	
2,4-D	<0.001	
2,4-DB	<0.0025	
DIALATE (AVADEX)	<0.01	
3,5-DICHLOROBEZOIC ACID	<0.0005	
DIMETHOATE (CYGON)	<0.1	
DISULFOTON	<0.01	
MCPA	<0.2	
MCPP	<0.2	
METHYL PARATHION (PENNCAP-M)	<0.01	
PHORATE (THIMET)	<0.01	
SULFOTEP	<0.01	
2,4,5-T	<0.0002	
2,4,5-TP (SILVEX)	<0.0002	

-- OTHER PARAMETERS --

4;4'-DDD	<0.0001	
4;4'-DDE	<0.0001	
4;4'-DDT	<0.0001	
ALDRIN	<0.00005	
ALPHA-BHC	<0.00005	
BETA-BHC	<0.00005	
GAMMA-CHLORDANE	<0.00005	
CYANIDE (CN) TOT	<0.005	<0.005
DELTA-BHC	<0.00005	
DIELDRIN	<0.0001	
ENDOSULFAN I	<0.00005	
ENDOSULFAN II	<0.0001	
ENDOSULFAN SULFATE	<0.0001	
ENDRIN	<0.0001	
ENDRIN ALDEHYDE	<0.0001	
ENDRIN KETONE	<0.0001	
GAMMA-BHC (LINDANE)	<0.00005	
HEPTACHLOR	<0.00005	
HEPTACHLOR EPOXIDE	<0.00005	
METHOXYCHLOR	<0.0005	
PRONAMIDE	<0.01	
SULFIDE AS S	<0.04	
CHEMICAL OXYGEN DEMAND		16.0
TOXAPHENE	<0.005	

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Sample Type: Monitoring Wells

SITE CODE	HL-94-2	HL-94-2
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	11:30	11:00
LAB	EL	EL
LAB NUMBER	94-13577	94-58160
SAMPLE NUMBER	HL-9404-106	HL-9411-107

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	37.15	32.82
PH (FLD)	7.93	7.68
PH		7.6
SC (UMHOS/CM AT 25 C)		976.0
SC (UMHOS/CM AT 25 C) (FLD)	1015.0	985.0
WATER TEMPERATURE (C) (FLD)	9.5	7.8

-- MAJOR CONSTITUENTS --

SULFATE (SO4)		94.0
CHLORIDE (CL)		55.0

-- NUTRIENTS --

NITRATE + NITRITE AS N		8.13
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05	<0.05
ARSENIC (AS) DIS	0.007	<0.005
BARIUM (BA) DIS	<0.1	<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01
COBALT (CO) DIS	<0.01	<0.01
COPPER (CU) DIS	<0.01	<0.01
IRON (FE) DIS		<0.03
LEAD (PB) DIS	<0.01	<0.01
MERCURY (HG) DIS	<0.001	<0.001
NICKEL (NI) DIS	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	0.027
SILVER (AG) DIS	<0.005	<0.005
THALLIUM (TL) DIS	<0.1	<0.1
TIN (SN) DIS	<0.1	
VANADIUM (V) DIS	<0.1	<0.1
ZINC (ZN) DIS	<0.01	<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYLCYANIDE	<0.02	
ALLYLCHLORIDE 3-CHLORO-1-PROPENE	<0.001	
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACROLEIN	<0.02	
ACRYLONITRILE	<0.02	<0.002
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001

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Sample Type: Monitoring Wells

SITE CODE	HL-94-2	HL-94-2
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	11:30	11:00
LAB	EL	EL
LAB NUMBER	94-13577	94-58160
SAMPLE NUMBER	HL-9404-106	HL-9411-107

-- VOLATILE ORGANICS --

CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.0062	0.0053
CHLOROMETHANE	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE	<0.001	
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYL METHACRYLATE	<0.001	
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
ISOBUTANOL	<0.05	
O-XYLENE	<0.001	<0.001
METHACRYLONITRILE	<0.02	
METHYL ETHYL KETONE	<0.02	
METHYL ETHYL KETONE		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYL METHACRYLATE	<0.002	
METHYLENE CHLORIDE	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE	<0.02	
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001
PICLORAM	<0.0005	

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE	<0.00005	
1,4-BENZENEDIAMINE	ND	
CHLOROBENZILATE	<0.01	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE	<0.01	
1,2,4-TRICHLOROBENZENE	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
1,3,5-TRINITROBENZENE	<0.01	
1,3-DICHLOROBENZENE	<0.001	
1,3-DICHLOROPROPANE	<0.001	
1,3-DINITROBENZENE	<0.01	
TRANS-1,4-DICHLORO-2-BUTENE		<0.002
1,4-DICHLORO-2-BUTENE	<0.002	
1,4-DICHLOROBENZENE	<0.001	<0.001
METHAPYRILENE	ND	
1-METHYLNAPHTHALENE	<0.01	
1-NAPHTHYLAMINE	<0.01	
2,3,4,6-TETRACHLOROPHENOL	<0.01	
2,4,5-TRICHLOROPHENOL	<0.01	
2,4,6-TRICHLOROPHENOL	<0.01	

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Table 1. (Continued)

State	County	Area (sq. miles)	Population (1950)	Population (1960)	Population (1970)
Alabama	Adams	1,100	10,000	12,000	15,000
Alabama	Cherokee	1,200	11,000	13,000	16,000
Alabama	Chilton	1,300	12,000	14,000	17,000
Alabama	Choctawhatchee	1,400	13,000	15,000	18,000
Alabama	Clay	1,500	14,000	16,000	19,000
Alabama	Clearwater	1,600	15,000	17,000	20,000
Alabama	Columbia	1,700	16,000	18,000	21,000
Alabama	Conley	1,800	17,000	19,000	22,000
Alabama	Coosa	1,900	18,000	20,000	23,000
Alabama	Covington	2,000	19,000	21,000	24,000
Alabama	Crenshaw	2,100	20,000	22,000	25,000
Alabama	Cullman	2,200	21,000	23,000	26,000
Alabama	Dale	2,300	22,000	24,000	27,000
Alabama	De Kalb	2,400	23,000	25,000	28,000
Alabama	De Kalb	2,500	24,000	26,000	29,000
Alabama	De Kalb	2,600	25,000	27,000	30,000
Alabama	De Kalb	2,700	26,000	28,000	31,000
Alabama	De Kalb	2,800	27,000	29,000	32,000
Alabama	De Kalb	2,900	28,000	30,000	33,000
Alabama	De Kalb	3,000	29,000	31,000	34,000
Alabama	De Kalb	3,100	30,000	32,000	35,000
Alabama	De Kalb	3,200	31,000	33,000	36,000
Alabama	De Kalb	3,300	32,000	34,000	37,000
Alabama	De Kalb	3,400	33,000	35,000	38,000
Alabama	De Kalb	3,500	34,000	36,000	39,000
Alabama	De Kalb	3,600	35,000	37,000	40,000
Alabama	De Kalb	3,700	36,000	38,000	41,000
Alabama	De Kalb	3,800	37,000	39,000	42,000
Alabama	De Kalb	3,900	38,000	40,000	43,000
Alabama	De Kalb	4,000	39,000	41,000	44,000
Alabama	De Kalb	4,100	40,000	42,000	45,000
Alabama	De Kalb	4,200	41,000	43,000	46,000
Alabama	De Kalb	4,300	42,000	44,000	47,000
Alabama	De Kalb	4,400	43,000	45,000	48,000
Alabama	De Kalb	4,500	44,000	46,000	49,000
Alabama	De Kalb	4,600	45,000	47,000	50,000
Alabama	De Kalb	4,700	46,000	48,000	51,000
Alabama	De Kalb	4,800	47,000	49,000	52,000
Alabama	De Kalb	4,900	48,000	50,000	53,000
Alabama	De Kalb	5,000	49,000	51,000	54,000
Alabama	De Kalb	5,100	50,000	52,000	55,000
Alabama	De Kalb	5,200	51,000	53,000	56,000
Alabama	De Kalb	5,300	52,000	54,000	57,000
Alabama	De Kalb	5,400	53,000	55,000	58,000
Alabama	De Kalb	5,500	54,000	56,000	59,000
Alabama	De Kalb	5,600	55,000	57,000	60,000
Alabama	De Kalb	5,700	56,000	58,000	61,000
Alabama	De Kalb	5,800	57,000	59,000	62,000
Alabama	De Kalb	5,900	58,000	60,000	63,000
Alabama	De Kalb	6,000	59,000	61,000	64,000
Alabama	De Kalb	6,100	60,000	62,000	65,000
Alabama	De Kalb	6,200	61,000	63,000	66,000
Alabama	De Kalb	6,300	62,000	64,000	67,000
Alabama	De Kalb	6,400	63,000	65,000	68,000
Alabama	De Kalb	6,500	64,000	66,000	69,000
Alabama	De Kalb	6,600	65,000	67,000	70,000
Alabama	De Kalb	6,700	66,000	68,000	71,000
Alabama	De Kalb	6,800	67,000	69,000	72,000
Alabama	De Kalb	6,900	68,000	70,000	73,000
Alabama	De Kalb	7,000	69,000	71,000	74,000
Alabama	De Kalb	7,100	70,000	72,000	75,000
Alabama	De Kalb	7,200	71,000	73,000	76,000
Alabama	De Kalb	7,300	72,000	74,000	77,000
Alabama	De Kalb	7,400	73,000	75,000	78,000
Alabama	De Kalb	7,500	74,000	76,000	79,000
Alabama	De Kalb	7,600	75,000	77,000	80,000
Alabama	De Kalb	7,700	76,000	78,000	81,000
Alabama	De Kalb	7,800	77,000	79,000	82,000
Alabama	De Kalb	7,900	78,000	80,000	83,000
Alabama	De Kalb	8,000	79,000	81,000	84,000
Alabama	De Kalb	8,100	80,000	82,000	85,000
Alabama	De Kalb	8,200	81,000	83,000	86,000
Alabama	De Kalb	8,300	82,000	84,000	87,000
Alabama	De Kalb	8,400	83,000	85,000	88,000
Alabama	De Kalb	8,500	84,000	86,000	89,000
Alabama	De Kalb	8,600	85,000	87,000	90,000
Alabama	De Kalb	8,700	86,000	88,000	91,000
Alabama	De Kalb	8,800	87,000	89,000	92,000
Alabama	De Kalb	8,900	88,000	90,000	93,000
Alabama	De Kalb	9,000	89,000	91,000	94,000
Alabama	De Kalb	9,100	90,000	92,000	95,000
Alabama	De Kalb	9,200	91,000	93,000	96,000
Alabama	De Kalb	9,300	92,000	94,000	97,000
Alabama	De Kalb	9,400	93,000	95,000	98,000
Alabama	De Kalb	9,500	94,000	96,000	99,000
Alabama	De Kalb	9,600	95,000	97,000	100,000
Alabama	De Kalb	9,700	96,000	98,000	101,000
Alabama	De Kalb	9,800	97,000	99,000	102,000
Alabama	De Kalb	9,900	98,000	100,000	103,000
Alabama	De Kalb	10,000	99,000	101,000	104,000
Alabama	De Kalb	10,100	100,000	102,000	105,000
Alabama	De Kalb	10,200	101,000	103,000	106,000
Alabama	De Kalb	10,300	102,000	104,000	107,000
Alabama	De Kalb	10,400	103,000	105,000	108,000
Alabama	De Kalb	10,500	104,000	106,000	109,000
Alabama	De Kalb	10,600	105,000	107,000	110,000
Alabama	De Kalb	10,700	106,000	108,000	111,000
Alabama	De Kalb	10,800	107,000	109,000	112,000
Alabama	De Kalb	10,900	108,000	110,000	113,000
Alabama	De Kalb	11,000	109,000	111,000	114,000
Alabama	De Kalb	11,100	110,000	112,000	115,000
Alabama	De Kalb	11,200	111,000	113,000	116,000
Alabama	De Kalb	11,300	112,000	114,000	117,000
Alabama	De Kalb	11,400	113,000	115,000	118,000
Alabama	De Kalb	11,500	114,000	116,000	119,000
Alabama	De Kalb	11,600	115,000	117,000	120,000
Alabama	De Kalb	11,700	116,000	118,000	121,000
Alabama	De Kalb	11,800	117,000	119,000	122,000
Alabama	De Kalb	11,900	118,000	120,000	123,000
Alabama	De Kalb	12,000	119,000	121,000	124,000
Alabama	De Kalb	12,100	120,000	122,000	125,000
Alabama	De Kalb	12,200	121,000	123,000	126,000
Alabama	De Kalb	12,300	122,000	124,000	127,000
Alabama	De Kalb	12,400	123,000	125,000	128,000
Alabama	De Kalb	12,500	124,000	126,000	129,000
Alabama	De Kalb	12,600	125,000	127,000	130,000
Alabama	De Kalb	12,700	126,000	128,000	131,000
Alabama	De Kalb	12,800	127,000	129,000	132,000
Alabama	De Kalb	12,900	128,000	130,000	133,000
Alabama	De Kalb	13,000	129,000	131,000	134,000
Alabama	De Kalb	13,100	130,000	132,000	135,000
Alabama	De Kalb	13,200	131,000	133,000	136,000
Alabama	De Kalb	13,300	132,000	134,000	137,000
Alabama	De Kalb	13,400	133,000	135,000	138,000
Alabama	De Kalb	13,500	134,000	136,000	139,000
Alabama	De Kalb	13,600	135,000	137,000	140,000
Alabama	De Kalb	13,700	136,000	138,000	141,000
Alabama	De Kalb	13,800	137,000	139,000	142,000
Alabama	De Kalb	13,900	138,000	140,000	143,000
Alabama	De Kalb	14,000	139,000	141,000	144,000
Alabama	De Kalb	14,100	140,000	142,000	145,000
Alabama	De Kalb	14,200	141,000	143,000	146,000
Alabama	De Kalb	14,300	142,000	144,000	147,000
Alabama	De Kalb	14,400	143,000	145,000	148,000
Alabama	De Kalb	14,500	144,000	146,000	149,000
Alabama	De Kalb	14,600	145,000	147,000	150,000
Alabama	De Kalb	14,700	146,000	148,000	151,000
Alabama	De Kalb	14,800	147,000	149,000	152,000
Alabama	De Kalb	14,900	148,000	150,000	153,000
Alabama	De Kalb	15,000	149,000	151,000	154,000
Alabama	De Kalb	15,100	150,000	152,000	155,000
Alabama	De Kalb	15,200	151,000	153,000	156,000
Alabama	De Kalb	15,300	152,000	154,000	157,000
Alabama	De Kalb	15,400	153,000	155,000	158,000
Alabama	De Kalb	15,500	154,000	156,000	159,000
Alabama	De Kalb	15,600	155,000	157,000	160,000
Alabama	De Kalb	15,700	156,000	158,000	161,000
Alabama	De Kalb	15,800	157,000	159,000	162,000
Alabama	De Kalb	15,900	158,000	160,000	163,000
Alabama	De Kalb	16,000	159,000	161,000	164,000
Alabama	De Kalb	16,100	160,000	162,000	165,000
Alabama	De Kalb	16,200	161,000	163,000	166,000
Alabama	De Kalb	16,300	162,000	164,000	167,000
Alabama	De Kalb	16,400	163,000	165,000	168,000
Alabama	De Kalb	16,500	164,000	166,000	169,000
Alabama	De Kalb	16,600	165,000	167,000	170,000
Alabama	De Kalb	16,700	166,000	168,000	171,000
Alabama	De Kalb	16,800	167,000	169,000	172,000
Alabama	De Kalb	16,900	168,000	170,000	173,000
Alabama	De Kalb	17,000	169,000	171,000	174,000
Alabama	De Kalb	17,100	170,000	172,000	175,000
Alabama	De Kalb	17,200	171,000	173,000	176,000
Alabama	De Kalb	17,300	172,000	174,000	177,000
Alabama	De Kalb	17,400	173,000	175,000	178,000
Alabama	De Kalb	17,500	174,000	176,000	179,000
Alabama	De Kalb	17,600	175,000	177,000	180,000
Alabama	De Kalb	17,700	176,000	178,000	181,000
Alabama	De Kalb	17,800	177,000	179,000	182,000
Alabama	De Kalb	17,900	178,000	180,000	183,000
Alabama	De Kalb	18,000	179,000	181,000	184,000
Alabama	De Kalb	18,100	180,000	182,000	185,000
Alabama	De Kalb	18,200	181,000	183,000	186,000
Alabama	De Kalb	18,300	182,000	184,000	187,000
Alabama	De Kalb	18,400	183,000	185,000	188,000
Alabama	De Kalb	18,500	184,000	186,000	189,000
Alabama	De Kalb	18,600	185,000	187,000	190,000
Alabama	De Kalb	18,700	186,000	188,000	191,000
Alabama	De Kalb	18,800	187,000	189,000	192,000
Alabama	De Kalb	18,900	188,000	190,000	193,000
Alabama	De Kalb	19,000	189,000	191,000	194,000
Alabama	De Kalb	19,100	190,000	192,000	195,000
Alabama	De Kalb	19,200	191,000	193,000	196,000
Alabama	De Kalb	19,300	192,000	194,000	197,000
Alabama	De Kalb	19,400	193,000	195,000	198,000
Alabama	De Kalb	19,500	194,000	196,000	199,000
Alabama	De Kalb	19,600	195,000	197,000	200,000
Alabama	De Kalb	19,700	196,000	198,000	201,000
Alabama	De Kalb	19,800	197,000	199,000	202,000
Alabama	De Kalb	19,900	198,000	200,000	203,000
Alabama	De Kalb	20,000	199,000	201,000	204,000
Alabama	De Kalb	20,100	200,000	202,000	205,000
Alabama	De Kalb	20,200	201,000	203,000	206,000
Alabama	De Kalb	20,300	202,000	204,000	207,000</

Sample Type: Monitoring Wells

SITE CODE	HL-94-2	HL-94-2
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	11:30	11:00
LAB	EL	EL
LAB NUMBER	94-13577	94-58160
SAMPLE NUMBER	HL-9404-106	HL-9411-107

-- SEMI-VOLATILE EXTRACTABLES --

2,4-DICHLOROPHENOL	<0.01
2,4-DIMETHYLPHENOL	<0.01
2,4-DINITROPHENOL	<0.05
2,4-DINITROTOLUENE	<0.01
2,6-DICHLOROPHENOL	<0.01
2,6-DINITROTOLUENE	<0.01
2-CHLORONAPHTHALENE	<0.01
2-CHLOROPHENOL	<0.01
2-METHYLNAPHTHALENE	<0.01
2-METHYLPHENOL (O-CRESOL)	<0.01
2-NAPHTHYLAMINE	<0.01
2-NITROANILINE	<0.01
2-NITROPHENOL	<0.01
2-PICOLINE	<0.01
3,3-DICHLOROBENZIDINE	<0.02
3-METHYLCHOLANTHRENE	<0.1
3-NITROANILINE	<0.01
4,6-DINITRO-2-METHYLPHENOL	<0.05
4-AMINOBIIPHENYL	<0.01
4-BROMOPHENYL PHENYL ETHER	<0.01
4-CHLORO-3-METHYLPHENOL	<0.01
4-CHLORO-2-METHYLPHENOL	<0.01
4-CHLOROPHENOL	<0.01
4-CHLOROPHENYL PHENYL ETHER	<0.01
4-METHYLPHENOL/3-METHYLPHENOL	<0.01
4-NITROANILINE	<0.01
4-NITROPHENOL	<0.0005
1,12-DIMETHYLBENZENE (A) ANTHRACENE	<0.01
A,A-DIMETHYLPHENETHYLAMINE	ND
ACENAPHTHENE	<0.01
ACENAPHTHYLENE	<0.01
ACETOPHENONE	<0.01
ANILINE	<0.01
ANTHRACENE	<0.01
ARAMITE	<0.01
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	<0.01
BENZIDINE	<0.02
BENZO (A) ANTHRACENE	<0.01
BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DINOSEB	<0.001

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Sample Type: Monitoring Wells

SITE CODE	HL-94-2	HL-94-2
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	11:30	11:00
LAB	EL	EL
LAB NUMBER	94-13577	94-58160
SAMPLE NUMBER	HL-9404-106	HL-9411-107

-- SEMI-VOLATILE EXTRACTABLES --

DIPHENYLAMINE	<0.01	
ETHYL METHANESULFONATE	<0.01	
FAMPHUR	<0.01	
FLUORANTHENE	<0.01	
FLUORENE	<0.01	
2-ACETYL AMINO FLUORENE	<0.01	
HEXACHLOROBENZENE	<0.01	
HEXACHLOROBUTADIENE	<0.001	
HEXACHLOROCYCLOPENTADIENE	<0.01	
HEXACHLOROETHANE	<0.01	
HEXACHLOROPHENE	ND	
HEXACHLOROPHOPENE	<0.01	
INDENO (1,2,3-CD) PYRENE	<0.01	
ISODRIN	<0.0001	
ISOPHORONE	<0.01	
KEPONE	<0.001	
ISOSAFROLE	<0.01	
METHYL METHANESULFONATE	<0.01	
5-NITRO-O-TOLUIDINE	<0.01	
N-NITROSO-DI-N-BUTYLAMINE	<0.01	
N-NITROSO-DI-N-PROPYLAMINE	<0.01	
N-NITROSODIMETHYLAMINE	<0.01	
N-NITROSODIPHENYLAMINE	<0.01	
N-NITROSOPIPERIDINE	<0.01	
N-NITROSODIETHYLAMINE	<0.01	
N-NITROSOPYRROLIDINE	<0.01	
O-TOLUIDINE	<0.01	
N-NITROSOMORPHOLINE	<0.01	
N-NITROSOMETHYLETHYLAMINE	<0.01	
NAPHTHALENE	<0.001	
NITROBENZENE	<0.01	
4-NITROQUINOLINE-N-OXIDE	<0.1	
P-CHLOROTOLUENE	<0.01	
P-CHLOROANILINE	<0.01	
P-DIMETHYLAMINOAZOBENZENE	<0.01	
1,4-NAPHTHOQUINONE	<0.1	
PARATHION	<0.01	
PENTACHLOROBENZENE	<0.01	
PENTACHLORONITROBENZENE	<0.01	
PENTACHLOROPHENOL	<0.0005	
PHENACETIN	<0.01	
PHENANTHRENE	<0.01	
PHENOL	<0.01	
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01	
PYRENE	<0.01	
PYRIDINE	<0.02	
SAFROLE	<0.01	
THIOAZIN	<0.01	

-- HYDROCARBONS --

M+P-XYLENE	<0.001	
M+P-XYLENE		<0.001
ACIFLOURFEN	<0.0005	
BENTAZON	<0.0025	
CHLORAMBEN	<0.0005	
DACTHAL	<0.001	
DALAPON	<0.01	

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Sample Type: Monitoring Wells

SITE CODE	HL-94-2	HL-94-2
SAMPLE DATE	04/08/94	11/18/94
SAMPLE TIME	11:30	11:00
LAB	EL	EL
LAB NUMBER	94-13577	94-58160
SAMPLE NUMBER	HL-9404-106	HL-9411-107

-- HYDROCARBONS --

DICAMBA	<0.00025	
DICHLORPROP	<0.001	
AROCLOR 1016	<0.001	
AROCLOR 1221	<0.002	
AROCLOR 1232	<0.001	
AROCLOR 1242	<0.001	
AROCLOR 1248	<0.001	
AROCLOR 1254	<0.001	
AROCLOR 1260	<0.001	
AROCLOR 1262	<0.001	
AROCLOR 1268	<0.001	
2,4-D	<0.001	
2,4-DB	<0.0025	
DIALATE (AVADEX)	<0.01	
3,5-DICHLOROBEZOIC ACID	<0.0005	
DIMETHOATE (CYGON)	<0.1	
DISULFOTON	<0.01	
MCPA	<0.2	
MCP	<0.2	
METHYL PARATHION (PENNCAP-M)	<0.01	
PHORATE (THIMET)	<0.01	
SULFOTEP	<0.01	
2,4,5-T	<0.0002	
2,4,5-TP (SILVEX)	<0.0002	

-- OTHER PARAMETERS --

4,4'-DDD	<0.0001	
4,4'-DDE	<0.0001	
4,4'-DDT	<0.0001	
ALDRIN	<0.00005	
ALPHA-BHC	<0.00005	
BETA-BHC	<0.00005	
GAMMA-CHLORDANE	<0.00005	
CYANIDE (CN) TOT	<0.005	<0.005
DELTA-BHC	<0.00005	
DIELDRIN	<0.0001	
ENDOSULFAN I	<0.00005	
ENDOSULFAN II	<0.0001	
ENDOSULFAN SULFATE	<0.0001	
ENDRIN	<0.0001	
ENDRIN ALDEHYDE	<0.0001	
ENDRIN KETONE	<0.0001	
GAMMA-BHC (LINDANE)	<0.00005	
HEPTACHLOR	<0.00005	
HEPTACHLOR EPOXIDE	<0.00005	
METHOXYCHLOR	<0.0005	
PRONAMIDE	<0.01	
SULFIDE AS S	<0.04	
CHEMICAL OXYGEN DEMAND		9.0
TOXAPHENE	<0.005	

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Sample Type: Monitoring Wells

SITE CODE	HL-94-3	HL-94-3
SAMPLE DATE	11/18/94	11/18/94
SAMPLE TIME	14:15	14:45
LAB	EL	EL
LAB NUMBER	94-58161	94-58163
REMARKS		DUPLICATE
SAMPLE NUMBER	HL-9411-108	HL-9411-114

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	34.82	34.82
PH (FLD)	7.52	7.52
PH	7.7	7.9
SC (UMHOS/CM AT 25 C)	806.0	811.0
SC (UMHOS/CM AT 25 C) (FLD)	805.0	805.0
WATER TEMPERATURE (C) (FLD)	9.6	9.6

-- MAJOR CONSTITUENTS --

SULFATE (SO4)	166.0	166.0
CHLORIDE (CL)	32.0	32.0

-- NUTRIENTS --

NITRATE + NITRITE AS N	10.5	10.1
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-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS	<0.05	<0.05
ARSENIC (AS) DIS	<0.005	<0.005
BARIUM (BA) DIS	<0.1	<0.1
BERYLLIUM (BE) DIS	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01
COBALT (CO) DIS	<0.01	<0.01
COPPER (CU) DIS	<0.01	<0.01
IRON (FE) DIS	<0.03	<0.03
LEAD (PB) DIS	<0.01	<0.01
MERCURY (HG) DIS	<0.001	<0.001
NICKEL (NI) DIS	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	<0.005
SILVER (AG) DIS	<0.005	<0.005
THALLIUM (TL) DIS	<0.1	<0.1
VANADIUM (V) DIS	<0.1	<0.1
ZINC (ZN) DIS	<0.01	<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	0.0012	0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.013	0.012

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ANNUAL REPORT

1914-15	1915-16	1916-17
1917-18	1918-19	1919-20
1920-21	1921-22	1922-23
1923-24	1924-25	1925-26
1926-27	1927-28	1928-29
1929-30	1930-31	1931-32
1932-33	1933-34	1934-35
1935-36	1936-37	1937-38
1938-39	1939-40	1940-41
1941-42	1942-43	1943-44
1944-45	1945-46	1946-47
1947-48	1948-49	1949-50
1950-51	1951-52	1952-53
1953-54	1954-55	1955-56
1956-57	1957-58	1958-59
1959-60	1960-61	1961-62
1962-63	1963-64	1964-65
1965-66	1966-67	1967-68
1968-69	1969-70	1970-71
1971-72	1972-73	1973-74
1974-75	1975-76	1976-77
1977-78	1978-79	1979-80
1980-81	1981-82	1982-83
1983-84	1984-85	1985-86
1986-87	1987-88	1988-89
1989-90	1990-91	1991-92
1992-93	1993-94	1994-95
1995-96	1996-97	1997-98
1998-99	1999-00	2000-01
2001-02	2002-03	2003-04
2004-05	2005-06	2006-07
2007-08	2008-09	2009-10
2010-11	2011-12	2012-13
2013-14	2014-15	2015-16
2016-17	2017-18	2018-19
2019-20	2020-21	2021-22
2022-23	2023-24	2024-25
2025-26	2026-27	2027-28
2028-29	2029-30	2030-31
2031-32	2032-33	2033-34
2034-35	2035-36	2036-37
2037-38	2038-39	2039-40
2040-41	2041-42	2042-43
2043-44	2044-45	2045-46
2046-47	2047-48	2048-49
2049-50	2050-51	2051-52
2052-53	2053-54	2054-55
2055-56	2056-57	2057-58
2058-59	2059-60	2060-61
2061-62	2062-63	2063-64
2064-65	2065-66	2066-67
2067-68	2068-69	2069-70
2070-71	2071-72	2072-73
2073-74	2074-75	2075-76
2076-77	2077-78	2078-79
2079-80	2080-81	2081-82
2082-83	2083-84	2084-85
2085-86	2086-87	2087-88
2088-89	2089-90	2090-91
2091-92	2092-93	2093-94
2094-95	2095-96	2096-97
2097-98	2098-99	2099-00
2100-01	2101-02	2102-03
2103-04	2104-05	2105-06
2106-07	2107-08	2108-09
2109-10	2110-11	2111-12
2112-13	2113-14	2114-15
2115-16	2116-17	2117-18
2118-19	2119-20	2120-21
2121-22	2122-23	2123-24
2124-25	2125-26	2126-27
2127-28	2128-29	2129-30
2130-31	2131-32	2132-33
2133-34	2134-35	2135-36
2136-37	2137-38	2138-39
2139-40	2140-41	2141-42
2142-43	2143-44	2144-45
2145-46	2146-47	2147-48
2148-49	2149-50	2150-51
2151-52	2152-53	2153-54
2154-55	2155-56	2156-57
2157-58	2158-59	2159-60
2160-61	2161-62	2162-63
2163-64	2164-65	2165-66
2166-67	2167-68	2168-69
2169-70	2170-71	2171-72
2172-73	2173-74	2174-75
2175-76	2176-77	2177-78
2178-79	2179-80	2180-81
2181-82	2182-83	2183-84
2184-85	2185-86	2186-87
2187-88	2188-89	2189-90
2190-91	2191-92	2192-93
2193-94	2194-95	2195-96
2196-97	2197-98	2198-99
2199-00	2200-01	2201-02
2202-03	2203-04	2204-05
2205-06	2206-07	2207-08
2208-09	2209-10	2210-11
2211-12	2212-13	2213-14
2214-15	2215-16	2216-17
2217-18	2218-19	2219-20
2220-21	2221-22	2222-23
2223-24	2224-25	2225-26
2226-27	2227-28	2228-29
2229-30	2230-31	2231-32
2232-33	2233-34	2234-35
2235-36	2236-37	2237-38
2238-39	2239-40	2240-41
2241-42	2242-43	2243-44
2244-45	2245-46	2246-47
2247-48	2248-49	2249-50
2250-51	2251-52	2252-53
2253-54	2254-55	2255-56
2256-57	2257-58	2258-59
2259-60	2260-61	2261-62
2262-63	2263-64	2264-65
2265-66	2266-67	2267-68
2268-69	2269-70	2270-71
2271-72	2272-73	2273-74
2274-75	2275-76	2276-77
2277-78	2278-79	2279-80
2280-81	2281-82	2282-83
2283-84	2284-85	2285-86
2286-87	2287-88	2288-89
2289-90	2290-91	2291-92
2292-93	2293-94	2294-95
2295-96	2296-97	2297-98
2298-99	2299-00	2300-01
2301-02	2302-03	2303-04
2304-05	2305-06	2306-07
2307-08	2308-09	2309-10
2310-11	2311-12	2312-13
2313-14	2314-15	2315-16
2316-17	2317-18	2318-19
2319-20	2320-21	2321-22
2322-23	2323-24	2324-25
2325-26	2326-27	2327-28
2328-29	2329-30	2330-31
2331-32	2332-33	2333-34
2334-35	2335-36	2336-37
2337-38	2338-39	2339-40
2340-41	2341-42	2342-43
2343-44	2344-45	2345-46
2346-47	2347-48	2348-49
2349-50	2350-51	2351-52
2352-53	2353-54	2354-55
2355-56	2356-57	2357-58
2358-59	2359-60	2360-61
2361-62	2362-63	2363-64
2364-65	2365-66	2366-67
2367-68	2368-69	2369-70
2370-71	2371-72	2372-73
2373-74	2374-75	2375-76
2376-77	2377-78	2378-79
2379-80	2380-81	2381-82
2382-83	2383-84	2384-85
2385-86	2386-87	2387-88
2388-89	2389-90	2390-91
2391-92	2392-93	2393-94
2394-95	2395-96	2396-97
2397-98	2398-99	2399-00
2400-01	2401-02	2402-03
2403-04	2404-05	2405-06
2406-07	2407-08	2408-09
2409-10	2410-11	2411-12
2412-13	2413-14	2414-15
2415-16	2416-17	2417-18
2418-19	2419-20	2420-21
2421-22	2422-23	2423-24
2424-25	2425-26	2426-27
2427-28	2428-29	2429-30
2430-31	2431-32	2432-33
2433-34	2434-35	2435-36
2436-37	2437-38	2438-39
2439-40	2440-41	2441-42
2442-43	2443-44	2444-45
2445-46	2446-47	2447-48
2448-49	2449-50	2450-51
2451-52	2452-53	2453-54
2454-55	2455-56	2456-57
2457-58	2458-59	2459-60
2460-61	2461-62	2462-63
2463-64	2464-65	2465-66
2466-67	2467-68	2468-69
2469-70	2470-71	2471-72
2472-73	2473-74	2474-75
2475-76	2476-77	2477-78
2478-79	2479-80	2480-81
2481-82	2482-83	2483-84
2484-85	2485-86	2486-87
2487-88	2488-89	2489-90
2490-91	2491-92	2492-93
2493-94	2494-95	2495-96
2496-97	2497-98	2498-99
2499-00	2500-01	2501-02
2502-03	2503-04	2504-05
2505-06	2506-07	2507-08
2508-09	2509-10	2510-11
2511-12	2512-13	2513-14
2514-15	2515-16	2516-17
2517-18	2518-19	2519-20
2520-21	2521-22	2522-23
2523-24	2524-25	2525-26
2526-27	2527-28	2528-29
2529-30	2530-31	2531-32
2532-33	2533-34	2534-35
2535-36	2536-37	2537-38
2538-39	2539-40	2540-41
2541-42	2542-43	2543-44
2544-45	2545-46	2546-47
2547-48	2548-49	2549-50
2550-51	2551-52	2552-53
2553-54	2554-55	2555-56
2556-57	2557-58	2558-59
2559-60	2560-61	2561-62
2562-63	2563-64	2564-65
2565-66	2566-67	2567-68
2568-69	2569-70	2570-71
2571-72	2572-73	2573-74
2574-75	2575-76	2576-77
2577-78	2578-79	2579-80
2580-81	2581-82	2582-83
2583-84	2584-85	2585-86
2586-87	2587-88	2588-89
2589-90	2590-91	2591-92
2592-93	2593-94	2594-95
2595-96	2596-97	2597-98
2598-99	2599-00	2600-01
2601-02	2602-03	2603-04
2604-05	2605-06	2606-07
2607-08	2608-09	2609-10
2610-11	2611-12	2612-13
2613-14	2614-15	2615-16
2616-17	2617-18	2618-19
2619-20	2620-21	2621-22
2622-23	2623-24	2624-25
2625-26	2626-27	2627-28
2628-29	2629-30	2630-31
2631-32	2632-33	2633-34
2634-35	2635-36	2636-37
2637-38	2638-39	2639-40
2640-41	2641-42	2642-43
2643-44	2644-45	2645-46
2646-47	2647-48	2648-49
2649-50	2650-51	2651-52
2652-53	2653-54	2654-55
2655-56	2656-57	2657-58
2658-59	2659-60	2660-61
2661-62	2662-63	2663-64
2664-65	2665-66	2666-67
2667-68	2668-69	2669-70
2670-71	2671-72	2672-73
2673-74	2674-75	2675-76
2676-77	2677-78	2678-79
2679-80	2680-81	2681-82
2682-83	2683-84	2684-85
2685-86	2686-87	2687-88
2688-89	2689-90	2690-91
2691-92	2692-93	2693-94
2694-95	2695-96	2696-97
2697-98	2698-99	2699-00
2700-01	2701-02	2702-03
2703-04	2704-05	2705-06
2706-07	2707-08	2708-09
2709-10	2710-11	2711-12
2712-13	2713-14	2714-15
2715-16	2716-17	2717-18
2718-19	2719-20	2720-21
2721-22	2722-23	2723-24
2724-25	2725-26	2726-27
2727-28	2728-29	2729-30
2730-31	2731-32	2732-33
2733-34	2734-35	2735-36
2736-37	2737-38	2738-39
2739-40	2740-41	2741-42
2742-43	2743-44	2744-45
2745-46	2746-47	2747-48
2748-49	2749-50	2750-51
2751-52	2752-53	2753-54
2754-55	2755-56	2756-57
2757-58	2758-59	2759-60
2760-61	2761-62	2762-63
2763-64	2764-65	2765-66
2766-67	2767-68	2768-69
2769-70	2770-71	2771-72
2772-73	2773-74	2774-75
2775-76	2776-77	2777-78
2778-79	2779-80	2780-81
2781-82	2782-83	2783-84
2784-85	2785-86	2786-87
2787-88	2788-89	2789-90

Sample Type: Monitoring Wells

	HL-94-3	HL-94-3
SITE CODE	HL-94-3	HL-94-3
SAMPLE DATE	11/18/94	11/18/94
SAMPLE TIME	14:15	14:45
LAB	EL	EL
LAB NUMBER	94-58161	94-58163
REMARKS		DUPLICATE
SAMPLE NUMBER	HL-9411-108	HL-9411-114

-- VOLATILE ORGANICS --

	HL-94-3	HL-94-3
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE	<0.02	<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

	HL-94-3	HL-94-3
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002
1,4-DICHLOROBENZENE	<0.001	<0.001

-- HYDROCARBONS --

	HL-94-3	HL-94-3
M+P-XYLENE	<0.001	<0.001

-- OTHER PARAMETERS --

	HL-94-3	HL-94-3
CYANIDE (CN) TOT	<0.005	0.047
CHEMICAL OXYGEN DEMAND	6.0	5.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162
SAMPLE NUMBER	MPC-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)		20.9	20.68	20.21	20.88	21.1	21.28
PH (FLD)		7.32	7.69	6.53	7.4	7.2	7.28
PH	7.5	7.4	7.3	7.2			7.2
SC (UMHOS/CM AT 25 C)	1070.0	1020.0	998.0	1170.0			1130.0
SC (UMHOS/CM AT 25 C) (FLD)		1122.0	1076.0	1247.0	1168.0	984.0	1089.0
TDS - CALCULATED	738.0						
TDS (MEASURED AT 180 C)		671.0	690.0				
TOTAL SUSPENDED SOLIDS		1300.0	4040.0				
WATER TEMPERATURE (C) (FLD)		11.5	11.1	9.1	8.7	13.0	9.9
-- MAJOR CONSTITUENTS --							
TOTAL HARDNESS AS CaCO3	626.0						
CALCIUM (CA) DIS	162.0	118.0	117.0				
MAGNESIUM (MG) DIS	54.0	44.0	42.0				
SODIUM (NA) DIS	29.0	27.0	27.0				
POTASSIUM (K) DIS	2.0	3.0	3.0				
TOTAL ALKALINITY AS CaCO3	315.0	274.0	244.0				
BICARBONATE (HCO3)	384.0	334.0	297.0				
CARBONATE AS CO3	0.0	0.0	0.0				
SULFATE (SO4)	232.0	167.0	156.0	190.0			177.0
CHLORIDE (CL)	53.0	52.0	44.0	54.0			52.0
-- NUTRIENTS --							
AMMONIA (NH3 AS N)		<0.1	<0.1				
NITRATE (NO3-N)	12.4		12.1	10.4			
NITRATE + NITRITE AS N		11.2					11.6
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) DIS				<0.05	<0.05		<0.05
ARSENIC (AS) DIS		<0.005	<0.005	<0.005	<0.005		<0.005
BARIUM (BA) DIS		<0.1	<0.1	<0.1	<0.1		<0.1
BERYLLIUM (BE) DIS				<0.001	<0.001		<0.001
CADMIUM (CD) DIS		<0.001	<0.001	0.001	<0.001		<0.001
CHROMIUM (CR) DIS		<0.01	<0.01	<0.01	<0.01		<0.01
COBALT (CO) DIS				<0.01	<0.01		<0.01
COPPER (CU) DIS				<0.01	<0.01		<0.01
IRON (FE) DIS	1.69	<0.03	<0.03	<0.03	<0.01		<0.03
LEAD (PB) DIS		<0.01	<0.01	<0.01	<0.01		<0.01
MANGANESE (MN) DIS		<0.01	<0.01				
MERCURY (HG) DIS		<0.001	<0.001	<0.001	<0.001		<0.001
NICKEL (NI) DIS				<0.01	<0.01		<0.01
SELENIUM (SE) DIS		<0.005	<0.005	<0.005	<0.005		<0.005
SILVER (AG) DIS		<0.005	<0.005	<0.005	<0.005		<0.005
THALLIUM (TL) DIS				<0.1	<0.1		<0.1
TIN (SN) DIS					<0.1		
VANADIUM (V) DIS				<0.1	<0.1		<0.1
ZINC (ZN) DIS				0.08	0.02		<0.01
-- VOLATILE ORGANICS --							
ACETONITRILE METHYLCYANIDE					<0.02		
ALLYLCHLORIDE 3-CHLORO-1-PROPENE					<0.001		
1,1,1,2-TETRACHLOROETHANE	<0.0005			<0.001	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.002	0.0026	0.0016	0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0059	0.0062	0.0031	0.0053	0.0073	0.0057	0.0063
1,1-DICHLOROETHENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	SITE CODE	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94	
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45	
LAB	EL	EL	EL	EL	EL	EL	EL	
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162	
SAMPLE NUMBER	MPC-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113	

-- VOLATILE ORGANICS --

1,1-DICHLOROPROPENE	<0.0005				<0.001		
1,2-DIBROMOETHANE	<0.0005			<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.0005			<0.001	<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.0005				<0.001		
2-CHLOROETHYL VINYL ETHER	<0.0005	<0.001	<0.001				
2-CHLOROTOLUENE	<0.0005						
2-HEXANONE				<0.02	<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE		<0.01	<0.01				
4-CHLOROTOLUENE	<0.0005						
ACETONE				<0.02	<0.05	<0.05	<0.05
ACROLEIN					<0.02		
ACRYLONITRILE				<0.02	<0.02	<0.02	<0.02
BENZENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOBENZENE	<0.0005						
BROMOCHLOROMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE				<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0031	0.0031	0.0018	0.0017	0.0025	0.0021	0.0022
CHLOROMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE					<0.001		
CIS-1,2-DICHLOROETHENE	0.0009			0.0013	0.0018	0.0012	0.0011
CIS-1,3-DICHLOROPROPENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.0005	<0.001	<0.001	0.0014	0.0034	0.0021	0.0023
ETHYL METHACRYLATE		<0.001	<0.001		<0.001		
ETHYLBENZENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ISOBUTANOL					<0.05		
TOTAL XYLENE	<0.0005	<0.001	<0.001				
M-P XYLENE				<0.001			
O-XYLENE				<0.001	<0.001	<0.001	<0.001
METHACRYLONITRILE					<0.02		
METHYL ETHYL KETONE					<0.02	<0.02	
METHYL ETHYL KETONE				<0.02			<0.02
METHYL ISOBUTYL KETONE				<0.02	<0.02	<0.02	<0.02
METHYL METHACRYLATE					<0.002		
METHYLENE CHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE					<0.02		
STYRENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.011	0.011	0.0068	0.017	0.013	0.012	0.012
TOLUENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0025	0.0024	0.0013	0.0024	0.0031	0.0027	0.0028
TRICHLOROFLUOROMETHANE	0.0007	<0.001	<0.001	0.0016	0.002	0.0014	0.0012
VINYL ACETATE		<0.02	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PICLORAM					<0.0005		

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE

<0.00005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162
SAMPLE NUMBER	MPC-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113

-- SEMI-VOLATILE EXTRACTABLES --

1,4-BENZENEDIAMINE						ND	
CHLOROBENZILATE						<0.01	
1,2,3-TRICHLOROPROPANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE						<0.01	
1,2,4-TRICHLOROBENZENE						<0.01	
1,2-DIBROMO-3-CHLOROPROPANE				<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.0005			<0.001	<1.0	<0.001	<0.001
1,3,5-TRINITROBENZENE						<0.01	
1,3-DICHLOROBENZENE	<0.0005					<1.0	
1,3-DICHLOROPROPANE	<0.0005					<0.001	
1,3-DINITROBENZENE						<0.01	
TRANS-1,4-DICHLORO-2-BUTENE				<0.002		<0.002	<0.002
1,4-DICHLORO-2-BUTENE						<0.002	
1,4-DICHLOROBENZENE	<0.0005			<0.001	<1.0	<0.001	<0.001
1,4-DIFLUOROBENZENE		<0.001	<0.001				
METHAPYRILENE						ND	
1-METHYLNAPHTHALENE						<0.01	
1-NAPHTHYLAMINE						<0.01	
2,3,4,6-TETRACHLOROPHENOL						<0.01	
2,4,5-TRICHLOROPHENOL						<0.01	
2,4,6-TRICHLOROPHENOL						<0.01	
2,4-DICHLOROPHENOL						<0.01	
2,4-DIMETHYLPHENOL						<0.01	
2,4-DINITROPHENOL						<0.05	
2,4-DINITROTOLUENE						<0.01	
2,6-DICHLOROPHENOL						<0.01	
2,6-DINITROTOLUENE						<0.01	
2-CHLORONAPHTHALENE						<0.01	
2-CHLOROPHENOL						<0.01	
2-METHYLNAPHTHALENE						<0.01	
2-METHYLPHENOL (O-CRESOL)						<0.01	
2-NAPHTHYLAMINE						<0.01	
2-NITROANILINE						<0.01	
2-NITROPHENOL						<0.01	
2-PICOLINE						<0.01	
3,3-DICHLOROBENZIDINE						<0.02	
3-METHYLCHOLANTHRENE						<0.1	
3-NITROANILINE						<0.01	
4,6-DINITRO-2-METHYLPHENOL						<0.05	
4-AMINOBIIPHENYL						<0.01	
4-BROMOPHENYL PHENYL ETHER						<0.01	
4-CHLORO-3-METHYLPHENOL						<0.01	
4-CHLORO-2-METHYLPHENOL						<0.01	
4-CHLOROPHENOL						<0.01	
4-CHLOROPHENYL PHENYL ETHER						<0.01	
4-METHYLPHENOL/3-METHYLPHENOL						<0.01	
4-NITROANILINE						<0.01	
4-NITROPHENOL						<0.00005	
7,12-DIMETHYLBENZENE (A) ANTHRACENE						<0.01	
A,A-DIMETHYLPHENETHYLAMINE						ND	
ACENAPHTHENE						<0.01	
ACENAPHTHYLENE						<0.01	
ACETOPHENONE						<0.01	
ANILINE						<0.01	
ANTHRACENE						<0.01	
ARAMITE						<0.01	
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)						<0.01	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

SITE CODE	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162
SAMPLE NUMBER	MPC-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113

-- SEMI-VOLATILE EXTRACTABLES --

BENZIDINE	<0.02
BENZO (A) ANTHRACENE	<0.01
BENZO (A) PYRENE	<0.01
BENZO (B) FLUORANTHENE	<0.01
BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DIOXEB	<0.001
DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.00001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHOPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1

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Sample Type: Monitoring Wells

SITE CODE	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1	MPC-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162
SAMPLE NUMBER	MPC-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113

-- SEMI-VOLATILE EXTRACTABLES --

PARATHION	<0.01
PENTACHLORO BENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01
PENTACHLOROPHENOL	<0.05
PHENACETIN	<0.01
PHENANTHRENE	<0.01
PHENOL	<0.01
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01
PYRENE	<0.01
PYRIDINE	<0.02
SAFROLE	<0.01
THIONAZIN	<0.01

-- HYDROCARBONS --

M+P-XYLENE	<0.001		
M+P-XYLENE		<0.001	<0.001
ACIFLOURFEN	<0.0005		
BENTAZON	<0.0025		
CHLORAM BEN	<0.0005		
DACTHAL	<0.001		
DALAPON	<0.01		
DICAMBA	<0.00025		
DICHLORPROP	<0.001		
AROCLOR 1016	<0.001		
AROCLOR 1221	<0.002		
AROCLOR 1232	<0.001		
AROCLOR 1242	<0.001		
AROCLOR 1248	<0.001		
AROCLOR 1254	<0.001		
AROCLOR 1260	<0.001		
AROCLOR 1262	<0.001		
AROCLOR 1268	<0.001		
2,4-D	<0.001		
2,4-DB	<0.0025		
DIALATE (AVADEX)	<0.01		
3,5-DICHLOROBEZOIC ACID	<0.0005		
DIMETHOATE (CYGON)	<0.1		
DISULFOTON	<0.01		
MCPA	<0.2		
MCPP	<0.2		
METHYL PARATHION (PENNCAP-M)	<0.01		
PHORATE (THIMET)	<0.01		
SULFOTEP	<0.01		
2,4,5-T	<0.0002		
2,4,5-TP (SILVEX)	<0.0002		

-- OTHER PARAMETERS --

4,4'-DDD	<0.0001		
4,4'-DDE	<0.0001		
4,4'-DDT	<0.0001		
ALDRIN	<0.00005		
ALPHA-BHC	<0.00005		
BETA-BHC	<0.00005		
GAMMA-CHLORDANE	<0.00005		
CYANIDE (CN) TOT	<0.005	0.03	0.033
DELTA-BHC	<0.00005		
DIELDRIN	<0.0001		

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1
SITE CODE	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1	MPG-HL-1
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	04/08/94	08/24/94	11/21/94
SAMPLE TIME		11:00	11:30	12:45	13:45	14:10	09:45
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-16654	92-49148	93-20450	93-59630	94-13578	94-40103	94-58162
SAMPLE NUMBER	MPG-9205-101	HL-9211-108	HL-9305-105	HL-9312-105	HL-9404-107	HL-9408-105	HL-9411-113

-- OTHER PARAMETERS --

ENDOSULFAN I					<0.00005		
ENDOSULFAN II					<0.0001		
ENDOSULFAN SULFATE					<0.0001		
ENDRIN					<0.0001		
ENDRIN ALDEHYDE					<0.0001		
ENDRIN KETONE					<0.0001		
GAMMA-BHC (LINDANE)					<0.00005		
HEPTACHLOR					<0.00005		
HEPTACHLOR EPOXIDE					<0.00005		
METHOXYCHLOR					<0.0005		
PRONAMIDE					<0.01		
SULFIDE AS S					0.04		
CHEMICAL OXYGEN DEMAND	<1.0	11.0	<1.0	<1.0			4.0
TOXAPHENE					<0.005		

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Sample Type: Monitoring Wells

SITE CODE	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	08/24/94	12/20/94
SAMPLE TIME		09:30	10:30	11:30	13:30	11:00
LAB	EL	HYDRO	EL	EL	EL	EL
LAB NUMBER	92-16655		93-20449	93-59629	94-40104	94-61430
REMARKS		NO SAMPLE				
SAMPLE NUMBER	MPC-9205-102	HL-9211-107	HL-9305-106	HL-9312-106	HL-9408-106	HL-9412-111
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)		16.06	15.67	16.01	16.01	16.18
PH (FLD)		7.36	7.74	7.51	7.31	
PH	7.7		7.6	7.2		
SC (UMHOS/CM AT 25 C)	632.0		634.0	793.0		
SC (UMHOS/CM AT 25 C) (FLD)		619.0	614.0	814.0	431.0	
TDS - CALCULATED	378.0					
TDS (MEASURED AT 180 C)			390.0			
TOTAL SUSPENDED SOLIDS			3100.0			
WATER TEMPERATURE (C) (FLD)		13.0	9.4	10.6	15.6	
-- MAJOR CONSTITUENTS --						
TOTAL HARDNESS AS CaCO3	323.0					
CALCIUM (CA) DIS	93.0		82.0			
MAGNESIUM (MG) DIS	22.0		20.0			
SODIUM (NA) DIS	16.0		17.0			
POTASSIUM (K) DIS	3.0		4.0			
TOTAL ALKALINITY AS CaCO3	262.0		219.0			
BICARBONATE (HCO3)	320.0		268.0			
CARBONATE AS CO3	0.0		0.0			
SULFATE (SO4)	51.0		52.0	60.0		
CHLORIDE (CL)	33.0		36.0	38.0		
-- NUTRIENTS --						
AMMONIA (NH3 AS N)			0.2			
NITRATE (NO3-N)	<0.05		<0.05	<0.05		
-- METALS & MINOR CONSTITUENTS --						
ANTIMONY (SB) DIS				<0.05		
ARSENIC (AS) DIS			0.017	0.025		
BARIUM (BA) DIS			0.1	0.1		
BERYLLIUM (BE) DIS				<0.001		
CADMIUM (CD) DIS			<0.001	<0.001		
CHROMIUM (CR) DIS			<0.01	<0.01		
COBALT (CO) DIS				<0.01		
COPPER (CU) DIS				<0.01		
IRON (FE) DIS	1.6		0.27	0.66		
LEAD (PB) DIS			<0.01	<0.01		
MANGANESE (MN) DIS			1.1			
MERCURY (HG) DIS			<0.001	<0.001		
NICKEL (NI) DIS				<0.01		
SELENIUM (SE) DIS			<0.005	<0.005		
SILVER (AG) DIS			<0.005	<0.005		
THALLIUM (TL) DIS				<0.1		
VANADIUM (V) DIS				<0.1		
ZINC (ZN) DIS				0.02		
-- VOLATILE ORGANICS --						
1,1,1,2-TETRACHLOROETHANE	<0.0005			<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0006		<0.002	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005		<0.002	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.0005					
1,2-DIBROMOETHANE	<0.0005			<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Monitoring Wells

	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2
SITE CODE	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	08/24/94	12/20/94
SAMPLE TIME		09:30	10:30	11:30	13:30	11:00
LAB	EL	HYDRO	EL	EL	EL	EL
LAB NUMBER	92-16655		93-20449	93-59629	94-40104	94-61430
REMARKS		NO SAMPLE				
SAMPLE NUMBER	MPC-9205-102	HL-9211-107	HL-9305-106	HL-9312-106	HL-9408-106	HL-9412-111

-- VOLATILE ORGANICS --

1,2-DICHLOROPROPANE	<0.0005			<0.001	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.0005					
2-CHLOROETHYL VINYL ETHER	<0.0005		<0.002			
2-CHLOROTOLUENE	<0.0005					
2-HEXANONE				<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE			<0.02			
4-CHLOROTOLUENE	<0.0005					
ACETONE				<0.02	<0.05	<0.05
ACRYLONITRILE				<0.02	<0.02	<0.02
BENZENE	<0.0005		<0.002	<0.001	<0.001	<0.001
BROMOBENZENE	<0.0005					
BROMOCHLOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
BROMOFORM	<0.0005		<0.002	<0.001	<0.001	<0.001
BROMOMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
CARBON DISULFIDE				<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005		<0.002	<0.001	<0.001	<0.001
CHLOROBEZENE	<0.0005		<0.002	<0.001	<0.001	<0.001
CHLOROETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
CHLOROFORM	<0.0005		<0.002	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.0005		<0.002	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.0005		<0.002	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
ETHYL METHACRYLATE			<0.002			
ETHYLBENZENE	<0.0005		<0.002	<0.001	<0.001	<0.001
IODOMETHANE			<0.002	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.0005		<0.002			
M-P XYLENE				<0.001		
O-XYLENE				<0.001	<0.001	<0.001
METHYL ETHYL KETONE					<0.02	
METHYL ETHYL KETONE				<0.02		<0.02
METHYL ISOBUTYL KETONE				<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.0005		<0.002	<0.001	<0.001	<0.001
STYRENE	<0.0005		<0.002	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.0005		<0.002	<0.001	<0.001	<0.001
TOLUENE	<0.0005		<0.002	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE			<0.002	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.0005		<0.002	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005		<0.002	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.0005		<0.002	<0.001	<0.001	<0.001
VINYL ACETATE			<0.002	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005		<0.002	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.0005		<0.002	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE				<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.0005			<0.001	<0.001	<0.001
1,3-DICHLOROBENZENE	<0.0005					
1,3-DICHLOROPROPANE	<0.0005					
TRANS-1,4-DICHLORO-2-BUTENE				<0.002	<0.002	<0.002
1,4-DICHLOROBENZENE	<0.0005			<0.001	<0.001	<0.001
1,4-DIFLUOROBENZENE			<0.002			
NAPHTHALENE				<0.001		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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Sample Type: Monitoring Wells

SITE CODE	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2	MPC-HL-2
SAMPLE DATE	05/06/92	11/19/92	05/27/93	12/16/93	08/24/94	12/20/94
SAMPLE TIME		09:30	10:30	11:30	13:30	11:00
LAB	EL	HYDRO	EL	EL	EL	EL
LAB NUMBER	92-16655		93-20449	93-59629	94-40104	94-61430
REMARKS		NO SAMPLE				
SAMPLE NUMBER	MPC-9205-102	HL-9211-107	HL-9305-106	HL-9312-106	HL-9408-106	HL-9412-111

-- HYDROCARBONS --

M+P-XYLENE

<0.001 <0.001

-- OTHER PARAMETERS --

CYANIDE (CN) TOT

<0.005 <0.005

CHEMICAL OXYGEN DEMAND

<1.0

10.0 <1.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1

1910	1911	1912	1913	1914	1915	1916
100	100	100	100	100	100	100
100	100	100	100	100	100	100
100	100	100	100	100	100	100
100	100	100	100	100	100	100
100	100	100	100	100	100	100
100	100	100	100	100	100	100

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Sample Type: Private Well

SITE CODE	5	5	5	5	5	5
SAMPLE DATE	04/13/91	12/02/92	11/11/93	01/05/94	04/18/94	12/08/94
SAMPLE TIME	13:00	12:05		11:45	11:50	12:00
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-13087	92-50587	93-21827	94-3538	94-16470	94-60433
SAMPLE NUMBER	HL-9104-110	HL-9212-906	HL-8	HL-105C1	HL-9	HL-9412-104
-- VOLATILE ORGANICS --						
1,1,1,2-TETRACHLOROETHANE				<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE				<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE				<0.001	<0.001	<0.001
2-BUTANONE (METHYL-ETHYL-KETONE)	<0.01					
2-CHLOROETHYL VINYL ETHER	<0.01	<0.001	<0.001			
2-HEXANONE	<0.01			<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01	<0.01			
4-METHYL-2-PENTANONE	<0.01					
ACETONE	<0.01			<0.02	<0.05	<0.05
ACROLEIN	<0.01					
ACRYLONITRILE	<0.01			<0.02	<0.02	<0.02
BENZENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.01			<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001	0.0021	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0023	0.0017	0.0024	0.0011	0.001	0.0016
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE				<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLOROFLUOROMETHANE				0.01	<0.001	
ETHANOL	<0.01					
ETHYL METHACRYLATE	<0.01	<0.001	<0.001			
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001	<0.001	<0.001		
O-XYLENE				<0.001	<0.001	<0.001
METHYL ETHYL KETONE				<0.02	<0.02	<0.02
METHYL ISOBUTYL KETONE				<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0005	<0.001	0.0013	0.0012	0.0012	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
-- SEMI-VOLATILE EXTRACTABLES --						
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE				<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE				<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	5	5	5	5	5	5
SAMPLE DATE	04/13/91	12/02/92	11/11/93	01/05/94	04/18/94	12/08/94
SAMPLE TIME	13:00	12:05		11:45	11:50	12:00
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-13087	92-50587	93-21827	94-3538	94-16470	94-60433
SAMPLE NUMBER	HL-9104-110	HL-9212-906	HL-8	HL-105C1	HL-9	HL-9412-104

-- SEMI-VOLATILE EXTRACTABLES --

TRANS-1,4-DICHLORO-2-BUTENE					<0.002	<0.002
1,4-DICHLORO-2-BUTENE	<0.01			<0.002	<0.002	
1,4-DICHLOROBENZENE				<0.001	<0.001	<0.001
1,4-DIFLUOROBENZENE	<0.01	<0.001	<0.001			
NAPHTHALENE				<0.001		

-- HYDROCARBONS --

M+P-XYLENE					<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

WATER RESOURCES DIVISION

1	2	3	4	5	6	7
1000000	1000000	1000000	1000000	1000000	1000000	1000000
1000000	1000000	1000000	1000000	1000000	1000000	1000000
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1000000	1000000	1000000	1000000	1000000	1000000	1000000
1000000	1000000	1000000	1000000	1000000	1000000	1000000

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1000000	1000000	1000000	1000000	1000000	1000000	1000000
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Sample Type: Private Well

SITE CODE 9
 SAMPLE DATE 06/06/90
 SAMPLE TIME 12:10
 LAB EL
 LAB NUMBER 90-15042
 SAMPLE NUMBER HL-9006-104

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1: Summary of Data

Year	Value	Year	Value
1990	1.0	1990	1.0
1991	1.1	1991	1.1
1992	1.2	1992	1.2
1993	1.3	1993	1.3
1994	1.4	1994	1.4
1995	1.5	1995	1.5
1996	1.6	1996	1.6
1997	1.7	1997	1.7
1998	1.8	1998	1.8
1999	1.9	1999	1.9
2000	2.0	2000	2.0
2001	2.1	2001	2.1
2002	2.2	2002	2.2
2003	2.3	2003	2.3
2004	2.4	2004	2.4
2005	2.5	2005	2.5
2006	2.6	2006	2.6
2007	2.7	2007	2.7
2008	2.8	2008	2.8
2009	2.9	2009	2.9
2010	3.0	2010	3.0
2011	3.1	2011	3.1
2012	3.2	2012	3.2
2013	3.3	2013	3.3
2014	3.4	2014	3.4
2015	3.5	2015	3.5
2016	3.6	2016	3.6
2017	3.7	2017	3.7
2018	3.8	2018	3.8
2019	3.9	2019	3.9
2020	4.0	2020	4.0

Sample Type: Private Well

SITE CODE 9
 SAMPLE DATE 06/06/90
 SAMPLE TIME 12:10
 LAB EL
 LAB NUMBER 90-15042
 SAMPLE NUMBER HL-9006-104

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE <0.001
 N-PROPYLBENZENE <0.001
 NAPHTHALENE <0.001
 P-ISOPROPYLTOLUENE <0.001
 SEC-BUTYLBENZENE <0.001
 TERT-BUTYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	13	13	13	13	13	13	13
SAMPLE DATE	02/16/90	05/04/90	04/04/91	01/22/92	05/20/92	12/01/92	05/26/93
SAMPLE TIME	09:30	09:30	11:30	14:30	09:30	13:40	
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-3298	90-10822	91-12763	92-4692	92-19276	92-50584	93-21825
SAMPLE NUMBER	HL-90-10	HL-9005-105	HL-9104-100	HL-9201-109	HL-9205-105	HL-9212-903	HL-6
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001					
1,1,1-TRICHLOROETHANE	0.00078	0.00079	0.00088	0.001	0.0005	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001	<0.001					
1,2-DIBROMOETHANE	<0.001	<0.001					
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001					
2,2-DICHLOROPROPANE	<0.001	<0.001					
2-BUTANONE (METHYL-ETHYL-KETONE)			<0.01				
2-CHLOROETHYL VINYL ETHER			<0.01	<0.01	<0.01	<0.001	<0.001
2-CHLOROTOLUENE	<0.001	<0.001					
2-HEXANONE			<0.01				
4-BROMOFLUOROBENZENE			<0.01	<0.01	<0.01	<0.01	<0.01
4-CHLOROTOLUENE	<0.001	<0.001					
4-METHYL-2-PENTANONE			<0.01				
ACETONE			<0.01				
ACROLEIN			<0.01				
ACRYLONITRILE			<0.01				
BENZENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
BROMOBENZENE	<0.001	<0.001					
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.01				
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0029	0.0044	0.0036	0.0038	0.0024	0.0011	0.0032
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001					
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0043	0.0023	0.0024	0.003	0.0021	<0.001	0.0025
ETHANOL			<0.01				
ETHYL METHACRYLATE			<0.01	<0.01	<0.01	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE			<0.01	<0.01	<0.01	<0.001	<0.001
TOTAL XYLENE			<0.001	<0.001	<0.001	<0.001	<0.001
M-XYLENE	<0.001	<0.001					
O-XYLENE	<0.001	<0.001					
P-XYLENE	<0.001	<0.001					
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0027	0.0023	0.0034	0.0037	0.0022	<0.001	0.0035
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	0.00074	0.0005	0.00054	<0.0005	<0.001	<0.001
TRICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	0.0012	<0.001	<0.001	<0.001
VINYL ACETATE			<0.01	<0.01	<0.01	<0.02	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROBENZENE	<0.001	<0.001					

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

SITE CODE	13	13	13	13	13	13	13
SAMPLE DATE	02/16/90	05/04/90	04/04/91	01/22/92	05/20/92	12/01/92	05/26/93
SAMPLE TIME	09:30	09:30	11:30	14:30	09:30	13:40	
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-3298	90-10822	91-12763	92-4692	92-19276	92-50584	93-21825
SAMPLE NUMBER	HL-90-10	HL-9005-105	HL-9104-100	HL-9201-109	HL-9205-105	HL-9212-903	HL-9301-100

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.001					
1,2,4-TRIMETHYLBENZENE	<0.001	<0.001					
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001					
1,2-DICHLOROBENZENE	<0.001	<0.001					
1,3,5-TRIMETHYLBENZENE	<0.001	<0.001					
1,3-DICHLOROBENZENE	<0.001	<0.001					
1,3-DICHLOROPROPANE	<0.001	<0.001					
1,4-DICHLORO-2-BUTENE			<0.01				
1,4-DICHLOROBENZENE	<0.0005	<0.0005					
1,4-DIFLUOROBENZENE			<0.01	<0.01	<0.01	<0.001	<0.001
DICHLOROMONOFLUOROMETHANE	0.001	<0.0019					
HEXACHLOROBUTADIENE	<0.001	<0.001					
ISOPROPYLBENZENE	<0.001	<0.001					
N-BUTYLBENZENE	<0.001	<0.001					
N-PROPYLBENZENE	<0.001	<0.001					
NAPHTHALENE	<0.001	<0.001					
P-ISOPROPYLTOLUENE	<0.001	<0.001					
SEC-BUTYLBENZENE	<0.001	<0.001					
TERT-BUTYLBENZENE	<0.001	<0.001					

Hydrometrics, Inc. 02/02/95

Sample Type: Private Well

SITE CODE	13	13	13	13
SAMPLE DATE	01/04/94	04/18/94	08/23/94	12/08/94
SAMPLE TIME	13:30	09:15	10:30	10:00
LAB	EL	EL	EL	EL
LAB NUMBER	94-3392	94-16463	94-40382	94-60430
SAMPLE NUMBER	HL-104J1	HL-2	HL-9408-110	HL-9412-100

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)				PUMPING
PH (FLD)				7.22
SC (UMHOS/CM AT 25 C) (FLD)				967.0
WATER TEMPERATURE (C) (FLD)				13.1

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001
2-HEXANONE	<0.02	<0.02	<0.02	<0.02
ACETONE	<0.02	<0.05	<0.05	<0.05
ACROLEIN			<0.02	
ACRYLONITRILE	<0.02	<0.02	<0.001	<0.02
BENZENE	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0053	0.0041	0.0042	0.0062
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0012	0.0022	0.0013	0.002
DICHLOROFLUOROMETHANE		0.015		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001			
O-XYLENE	<0.001	<0.001	<0.001	<0.001
METHYL ETHYL KETONE			<0.02	
METHYL ETHYL KETONE	<0.02	<0.02		<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.002	0.0021	0.0022	0.0032
TOLUENE	<0.001	<0.001	0.0062	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	<0.001	<0.005

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	13	13	13	13
SAMPLE DATE	01/04/94	04/18/94	08/23/94	12/08/94
SAMPLE TIME	13:30	09:15	10:30	10:00
LAB	EL	EL	EL	EL
LAB NUMBER	94-3392	94-16463	94-40382	94-60430
SAMPLE NUMBER	HL-104J1	HL-2	HL-9408-110	HL-9412-100

-- SEMI-VOLATILE EXTRACTABLES --

1,2-DICHLOROBENZENE	<0.001	<0.001	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE		<0.002	<0.002	<0.002
1,4-DICHLORO-2-BUTENE	<0.002	<0.002		
1,4-DICHLOROBENZENE	<0.001	<0.001	<0.001	<0.001

-- HYDROCARBONS --

M+P-XYLENE		<0.001	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1

1940	1941	1942	1943	1944
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0

100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0
100.0	100.0	100.0	100.0	100.0

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF AGRICULTURAL ECONOMICS
WASHINGTON, D. C.
1945

Sample Type: Private Well

SITE CODE 19
 SAMPLE DATE 05/04/90
 SAMPLE TIME 09:45
 LAB EL
 LAB NUMBER 90-10823
 SAMPLE NUMBER HL-9005-106

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE 19
SAMPLE DATE 05/04/90
SAMPLE TIME 09:45
LAB EL
LAB NUMBER 90-10823
SAMPLE NUMBER HL-9005-106

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE <0.001
N-PROPYLBENZENE <0.001
NAPHTHALENE <0.001
P-ISOPROPYLTOLUENE <0.001
SEC-BUTYLBENZENE <0.001
TERT-BUTYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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Sample Type: Private Well

SITE CODE 20
 SAMPLE DATE 05/06/90
 SAMPLE TIME 11:10
 LAB EL
 LAB NUMBER 90-10825
 SAMPLE NUMBER HL-9005-108

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	20
SAMPLE DATE	05/06/90
SAMPLE TIME	11:10
LAB	EL
LAB NUMBER	90-10825
SAMPLE NUMBER	HL-9005-108

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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Sample Type: Private Well

SITE CODE 23
 SAMPLE DATE 05/06/90
 SAMPLE TIME 11:15
 LAB EL
 LAB NUMBER 90-10826
 SAMPLE NUMBER HL-9005-109

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE 0.0019
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE 0.0011
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM 0.007
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE 0.0066
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE 0.0011
 STYRENE <0.001
 TETRACHLOROETHENE 0.0081
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE 0.0018
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE 0.0045
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	23
SAMPLE DATE	05/06/90
SAMPLE TIME	11:15
LAB	EL
LAB NUMBER	90-10826
SAMPLE NUMBER	HL-9005-109

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE 26
 SAMPLE DATE 05/03/90
 SAMPLE TIME 11:00
 LAB EL
 LAB NUMBER 90-10817
 SAMPLE NUMBER HL-9005-100

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	26
SAMPLE DATE	05/03/90
SAMPLE TIME	11:00
LAB	EL
LAB NUMBER	90-10817
SAMPLE NUMBER	HL-9005-100

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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Sample Type: Private Well

SITE CODE	28	28	28
SAMPLE DATE	06/05/90	05/25/93	04/18/94
SAMPLE TIME	10:30		
LAB	EL	EL	EL
LAB NUMBER	90-15038	93-21821	94-16468
SAMPLE NUMBER	HL-9006-100	HL-1	HL-7

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001		<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001		
1,2-DIBROMOETHANE	<0.001		<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001		<0.001
2,2-DICHLOROPROPANE	<0.001		
2-CHLOROETHYL VINYL ETHER		<0.001	
2-CHLOROTOLUENE	<0.001		
2-HEXANONE			<0.02
4-BROMOFLUOROBENZENE		<0.01	
4-CHLOROTOLUENE	<0.001		
ACETONE			<0.05
ACRYLONITRILE			<0.02
BENZENE	<0.0005	<0.001	<0.001
BROMOBENZENE	<0.001		
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	0.0019	<0.001	0.017
BROMOFORM	<0.001	<0.001	0.015
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	0.014	0.0057	0.013
CHLOROMETHANE	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001		<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	0.029
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001
DICHLOROFLUOROMETHANE			<0.001
ETHYL METHACRYLATE		<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE		<0.001	<0.001
TOTAL XYLENE		<0.001	
M-XYLENE	<0.001		
O-XYLENE	<0.001		<0.001
P-XYLENE	<0.001		
METHYL ETHYL KETONE			<0.02
METHYL ISOBUTYL KETONE			<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0074	0.0087	0.0052
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE		<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	28	28	28
SAMPLE DATE	06/05/90	05/25/93	04/18/94
SAMPLE TIME	10:30		
LAB	EL	EL	EL
LAB NUMBER	90-15038	93-21821	94-16468
SAMPLE NUMBER	HL-9006-100	HL-1	HL-7

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001		
1,2,4-TRIMETHYLBENZENE	<0.001		
1,2-DIBROMO-3-CHLOROPROPANE	<0.001		<0.001
1,2-DICHLOROBENZENE	<0.001		<0.001
1,3,5-TRIMETHYLBENZENE	<0.001		
1,3-DICHLOROBENZENE	<0.001		
1,3-DICHLOROPROPANE	<0.001		
TRANS-1,4-DICHLORO-2-BUTENE			<0.002
1,4-DICHLORO-2-BUTENE			<0.002
1,4-DICHLOROBENZENE	<0.0005		<0.001
1,4-DIFLUOROBENZENE		<0.001	
DICHLOROMONOFUOROMETHANE	<0.001		
HEXACHLOROBUTADIENE	<0.001		
ISOPROPYLBENZENE	<0.001		
N-BUTYLBENZENE	<0.001		
N-PROPYLBENZENE	<0.001		
NAPHTHALENE	<0.001		
P-ISOPROPYLTOLUENE	<0.001		
SEC-BUTYLBENZENE	<0.001		
TERT-BUTYLBENZENE	<0.001		

-- HYDROCARBONS --

M+P-XYLENE		<0.001	
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

	31	31	31	31	31	31	31
SITE CODE	31	31	31	31	31	31	31
SAMPLE DATE	05/03/90	04/13/91	01/29/92	05/28/92	12/02/92	05/28/93	01/04/94
SAMPLE TIME	12:50	13:20	17:20		12:38		15:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-10820	91-13088	92-5002	92-19788	92-50588	93-21830	94-3395
SAMPLE NUMBER	HL-9005-103	HL-9104-111	HL-9201-110	HL-9205-112	HL-9212-907	HL-11	HL-104G6

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001						<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001						
1,2-DIBROMOETHANE	<0.001						<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001						<0.001
2,2-DICHLOROPROPANE	<0.001						
2-BUTANONE (METHYL-ETHYL-KETONE)		<0.01					
2-CHLOROETHYL VINYL ETHER		<0.01	<0.01	<0.01	<0.001	<0.001	
2-CHLOROTOLUENE	<0.001						
2-HEXANONE		<0.01					<0.02
4-BROMOFLUOROBENZENE		<0.01	<0.01	<0.01	<0.01	<0.01	
4-CHLOROTOLUENE	<0.001						
4-METHYL-2-PENTANONE		<0.01					
ACETONE		<0.01					<0.02
ACROLEIN		<0.01					
ACRYLONITRILE		<0.01					<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
BROMOBENZENE	<0.001						
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.01					<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.01	0.0077	0.0088	0.009	0.0074	0.0086	0.0077
CHLORMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001						<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHANOL		<0.01					
ETHYL METHACRYLATE		<0.01	<0.01	<0.01	<0.001	<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE		<0.01	<0.01	<0.01	<0.001	<0.001	<0.001
TOTAL XYLENE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
M-XYLENE	<0.001						
O-XYLENE	<0.001						<0.001
P-XYLENE	<0.001						
METHYL ETHYL KETONE							<0.02
METHYL ISOBUTYL KETONE							<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0006	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE		<0.01	<0.01	<0.01	<0.02	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	31	31	31	31	31	31	31
SAMPLE DATE	05/03/90	04/13/91	01/29/92	05/28/92	12/02/92	05/28/93	01/04/94
SAMPLE TIME	12:50	13:20	17:20		12:38		15:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-10820	91-13088	92-5002	92-19788	92-50588	93-21830	94-3395
SAMPLE NUMBER	HL-9005-103	HL-9104-111	HL-9201-110	HL-9205-112	HL-9212-907	HL-11	HL-104G6

-- VOLATILE ORGANICS --

VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
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-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001						
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001						
1,2,4-TRIMETHYLBENZENE	<0.001						
1,2-DIBROMO-3-CHLOROPROPANE	<0.001						<0.001
1,2-DICHLOROBENZENE	<0.001						<0.001
1,3,5-TRIMETHYLBENZENE	<0.001						
1,3-DICHLOROBENZENE	<0.001						
1,3-DICHLOROPROPANE	<0.001						
1,4-DICHLORO-2-BUTENE		<0.01					<0.002
1,4-DICHLOROBENZENE	<0.0005						<0.001
1,4-DIFLUOROBENZENE		<0.01	<0.01	<0.01	<0.001	<0.001	
DICHLOROMONOFUOROMETHANE	<0.001						
HEXACHLOROBUTADIENE	<0.001						
ISOPROPYLBENZENE	<0.001						
N-BUTYLBENZENE	<0.001						
N-PROPYLBENZENE	<0.001						
NAFHTHALENE	<0.001						
P-ISOPROPYLTOLUENE	<0.001						
SEC-BUTYLBENZENE	<0.001						
TERT-BUTYLBENZENE	<0.001						

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Financial Statement

Assets	Liabilities	Equity	Assets	Liabilities	Equity	Assets	Liabilities
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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Sample Type: Private Well

SITE CODE	31	31
SAMPLE DATE	04/18/94	12/08/94
SAMPLE TIME		16:30
LAB	EL	EL
LAB NUMBER	94-16467	94-60431
SAMPLE NUMBER	HL-6	HL-9412-101

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROETHENE	<0.001	<0.001
CHLOROFORM	0.0065	0.008
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
DICHLOROFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE	<0.02	<0.02
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.005
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002
1,4-DICHLORO-2-BUTENE	<0.002	<0.002
1,4-DICHLOROBENZENE	<0.001	<0.001

-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

WATER RESOURCES

NO.	DATE	NAME
101-102	10/10/10	JOHN J. WATSON
101-103	10/11/10	JOHN J. WATSON
101-104	10/12/10	JOHN J. WATSON
101-105	10/13/10	JOHN J. WATSON
101-106	10/14/10	JOHN J. WATSON

WATER RESOURCES

101-107	10/15/10	JOHN J. WATSON
101-108	10/16/10	JOHN J. WATSON
101-109	10/17/10	JOHN J. WATSON
101-110	10/18/10	JOHN J. WATSON
101-111	10/19/10	JOHN J. WATSON
101-112	10/20/10	JOHN J. WATSON
101-113	10/21/10	JOHN J. WATSON
101-114	10/22/10	JOHN J. WATSON
101-115	10/23/10	JOHN J. WATSON
101-116	10/24/10	JOHN J. WATSON
101-117	10/25/10	JOHN J. WATSON
101-118	10/26/10	JOHN J. WATSON
101-119	10/27/10	JOHN J. WATSON
101-120	10/28/10	JOHN J. WATSON
101-121	10/29/10	JOHN J. WATSON
101-122	10/30/10	JOHN J. WATSON
101-123	10/31/10	JOHN J. WATSON
101-124	11/1/10	JOHN J. WATSON
101-125	11/2/10	JOHN J. WATSON
101-126	11/3/10	JOHN J. WATSON
101-127	11/4/10	JOHN J. WATSON
101-128	11/5/10	JOHN J. WATSON
101-129	11/6/10	JOHN J. WATSON
101-130	11/7/10	JOHN J. WATSON
101-131	11/8/10	JOHN J. WATSON
101-132	11/9/10	JOHN J. WATSON
101-133	11/10/10	JOHN J. WATSON
101-134	11/11/10	JOHN J. WATSON
101-135	11/12/10	JOHN J. WATSON
101-136	11/13/10	JOHN J. WATSON
101-137	11/14/10	JOHN J. WATSON
101-138	11/15/10	JOHN J. WATSON
101-139	11/16/10	JOHN J. WATSON
101-140	11/17/10	JOHN J. WATSON
101-141	11/18/10	JOHN J. WATSON
101-142	11/19/10	JOHN J. WATSON
101-143	11/20/10	JOHN J. WATSON
101-144	11/21/10	JOHN J. WATSON
101-145	11/22/10	JOHN J. WATSON
101-146	11/23/10	JOHN J. WATSON
101-147	11/24/10	JOHN J. WATSON
101-148	11/25/10	JOHN J. WATSON
101-149	11/26/10	JOHN J. WATSON
101-150	11/27/10	JOHN J. WATSON
101-151	11/28/10	JOHN J. WATSON
101-152	11/29/10	JOHN J. WATSON
101-153	11/30/10	JOHN J. WATSON
101-154	12/1/10	JOHN J. WATSON
101-155	12/2/10	JOHN J. WATSON
101-156	12/3/10	JOHN J. WATSON
101-157	12/4/10	JOHN J. WATSON
101-158	12/5/10	JOHN J. WATSON
101-159	12/6/10	JOHN J. WATSON
101-160	12/7/10	JOHN J. WATSON
101-161	12/8/10	JOHN J. WATSON
101-162	12/9/10	JOHN J. WATSON
101-163	12/10/10	JOHN J. WATSON
101-164	12/11/10	JOHN J. WATSON
101-165	12/12/10	JOHN J. WATSON
101-166	12/13/10	JOHN J. WATSON
101-167	12/14/10	JOHN J. WATSON
101-168	12/15/10	JOHN J. WATSON
101-169	12/16/10	JOHN J. WATSON
101-170	12/17/10	JOHN J. WATSON
101-171	12/18/10	JOHN J. WATSON
101-172	12/19/10	JOHN J. WATSON
101-173	12/20/10	JOHN J. WATSON
101-174	12/21/10	JOHN J. WATSON
101-175	12/22/10	JOHN J. WATSON
101-176	12/23/10	JOHN J. WATSON
101-177	12/24/10	JOHN J. WATSON
101-178	12/25/10	JOHN J. WATSON
101-179	12/26/10	JOHN J. WATSON
101-180	12/27/10	JOHN J. WATSON
101-181	12/28/10	JOHN J. WATSON
101-182	12/29/10	JOHN J. WATSON
101-183	12/30/10	JOHN J. WATSON
101-184	12/31/10	JOHN J. WATSON

WATER RESOURCES

101-185	10/1/11	JOHN J. WATSON
101-186	10/2/11	JOHN J. WATSON
101-187	10/3/11	JOHN J. WATSON
101-188	10/4/11	JOHN J. WATSON
101-189	10/5/11	JOHN J. WATSON
101-190	10/6/11	JOHN J. WATSON

WATER RESOURCES

101-191	10/7/11	JOHN J. WATSON
101-192	10/8/11	JOHN J. WATSON

Sample Type: Private Well

SITE CODE 32
 SAMPLE DATE 05/03/90
 SAMPLE TIME 11:40
 LAB EL
 LAB NUMBER 90-10818
 SAMPLE NUMBER HL-9005-101

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROETHANE <0.001
 CHLOROETHENE <0.001
 CHLOROPROPANE <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	32
SAMPLE DATE	05/03/90
SAMPLE TIME	11:40
LAB	EL
LAB NUMBER	90-10818
SAMPLE NUMBER	HL-9005-101

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

LANDS IN THE STATE OF TEXAS

THE LANDS IN THE STATE OF TEXAS ARE CLASSIFIED AS FOLLOWS:

CLASS	ACRES
Public Lands	1,234,567
Private Lands	987,654
Unsettled Lands	543,210
Total	2,765,432

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CLASS	ACRES
Public Lands	1,234,567
Private Lands	987,654
Unsettled Lands	543,210
Total	2,765,432

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THE LANDS IN THE STATE OF TEXAS ARE CLASSIFIED AS FOLLOWS:

CLASS	ACRES
Public Lands	1,234,567
Private Lands	987,654
Unsettled Lands	543,210
Total	2,765,432

Sample Type: Private Well

SITE CODE 34
 SAMPLE DATE 05/06/90
 SAMPLE TIME 11:00
 LAB EL
 LAB NUMBER 90-10824
 SAMPLE NUMBER HL-9005-107

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM 0.0056
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE 0.0022
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1: Summary of Data

Year	Value
1990	100
1991	105
1992	110
1993	115
1994	120
1995	125
1996	130
1997	135
1998	140
1999	145
2000	150

Year	Value
1990	100
1991	105
1992	110
1993	115
1994	120
1995	125
1996	130
1997	135
1998	140
1999	145
2000	150
2001	155
2002	160
2003	165
2004	170
2005	175
2006	180
2007	185
2008	190
2009	195
2010	200
2011	205
2012	210
2013	215
2014	220
2015	225
2016	230
2017	235
2018	240
2019	245
2020	250

Year	Value
1990	100
1991	105
1992	110
1993	115
1994	120
1995	125
1996	130
1997	135
1998	140
1999	145
2000	150
2001	155
2002	160
2003	165
2004	170
2005	175
2006	180
2007	185
2008	190
2009	195
2010	200
2011	205
2012	210
2013	215
2014	220
2015	225
2016	230
2017	235
2018	240
2019	245
2020	250

Sample Type: Private Well

SITE CODE	34
SAMPLE DATE	05/06/90
SAMPLE TIME	11:00
LAB	EL
LAB NUMBER	90-10824
SAMPLE NUMBER	HL-9005-107

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

1940-1941

1940-1941
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1940-1941

Sample Type: Private Well

SITE CODE 36
 SAMPLE DATE 06/05/90
 SAMPLE TIME 11:00
 LAB EL
 LAB NUMBER 90-15040
 SAMPLE NUMBER HL-9006-102

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.0005
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE <0.001
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Vegetable Crops

1. CUCUMBERS
2. MELONS
3. PEPPERS
4. TOMATOES
5. ZUCCHINI

1. CUCUMBERS
2. MELONS
3. PEPPERS
4. TOMATOES
5. ZUCCHINI
6. EGGS
7. CORN
8. POTATOES
9. SWEET POTATOES
10. CABBAGES
11. BRUSSELS SPROUTS
12. CAULIFLOWERS
13. BROCCOLIS
14. SPINACH
15. LETTUCES
16. ENDIVES
17. RADISHES
18. CARROTS
19. PARSNIPS
20. TURNIPS
21. BEETROOTS
22. ONIONS
23. GARLIC
24. ASPARAGUS
25. CAULI
26. PARSLEY
27. DILL
28. CHIVES
29. BASIL
30. MINT
31. PARSNIP
32. CELERY
33. FENNEL
34. CORIANDER
35. ANISE
36. CARAWAY
37. MUSTARD
38. CRESS
39. WATERCRESS
40. LEEKS
41. POTATOES
42. SWEET POTATOES
43. CABBAGES
44. BRUSSELS SPROUTS
45. CAULIFLOWERS
46. BROCCOLIS
47. SPINACH
48. LETTUCES
49. ENDIVES
50. RADISHES
51. CARROTS
52. PARSNIPS
53. TURNIPS
54. BEETROOTS
55. ONIONS
56. GARLIC
57. ASPARAGUS
58. CAULI
59. PARSLEY
60. DILL
61. CHIVES
62. BASIL
63. MINT
64. PARSNIP
65. CELERY
66. FENNEL
67. CORIANDER
68. ANISE
69. CARAWAY
70. MUSTARD
71. CRESS
72. WATERCRESS
73. LEEKS
74. POTATOES
75. SWEET POTATOES
76. CABBAGES
77. BRUSSELS SPROUTS
78. CAULIFLOWERS
79. BROCCOLIS
80. SPINACH
81. LETTUCES
82. ENDIVES
83. RADISHES
84. CARROTS
85. PARSNIPS
86. TURNIPS
87. BEETROOTS
88. ONIONS
89. GARLIC
90. ASPARAGUS
91. CAULI
92. PARSLEY
93. DILL
94. CHIVES
95. BASIL
96. MINT
97. PARSNIP
98. CELERY
99. FENNEL
100. CORIANDER
101. ANISE
102. CARAWAY
103. MUSTARD
104. CRESS
105. WATERCRESS
106. LEEKS
107. POTATOES
108. SWEET POTATOES
109. CABBAGES
110. BRUSSELS SPROUTS
111. CAULIFLOWERS
112. BROCCOLIS
113. SPINACH
114. LETTUCES
115. ENDIVES
116. RADISHES
117. CARROTS
118. PARSNIPS
119. TURNIPS
120. BEETROOTS
121. ONIONS
122. GARLIC
123. ASPARAGUS
124. CAULI
125. PARSLEY
126. DILL
127. CHIVES
128. BASIL
129. MINT
130. PARSNIP
131. CELERY
132. FENNEL
133. CORIANDER
134. ANISE
135. CARAWAY
136. MUSTARD
137. CRESS
138. WATERCRESS
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992. ANISE
993. CARAWAY
994. MUSTARD
995. CRESS
996. WATERCRESS
997. LEEKS
998. POTATOES
999. SWEET POTATOES
1000. CABBAGES

Sample Type: Private Well

SITE CODE 36
SAMPLE DATE 06/05/90
SAMPLE TIME 11:00
LAB EL
LAB NUMBER 90-15040
SAMPLE NUMBER HL-9006-102

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE <0.001
N-PROPYLBENZENE <0.001
NAPHTHALENE <0.001
P-ISOPROPYLTOLUENE <0.001
SEC-BUTYLBENZENE <0.001
TERT-BUTYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	38	38	38
SAMPLE DATE	05/03/90	05/03/90	01/22/92
SAMPLE TIME	13:10	13:40	14:15
LAB	EL	EL	EL
LAB NUMBER	90-10821	90-10833	92-4691
REMARKS	DUPLICATE		
SAMPLE NUMBER	HL-9005-104	HL-9005-204	HL-9201-108

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005
1,1-DICHLOROPROPENE	<0.001	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001	
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005
1,2-DICHLOROPROPANE	<0.001	<0.001	
2,2-DICHLOROPROPANE	<0.001	<0.001	
2-CHLOROETHYL VINYL ETHER			<0.01
2-CHLOROTOLUENE	<0.001	<0.001	
4-BROMOFLUOROBENZENE			<0.01
4-CHLOROTOLUENE	<0.001	<0.001	
BENZENE	<0.0005	<0.0005	<0.0005
BROMOBENZENE	<0.001	<0.001	
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001
CHLOROFORM	0.009	0.0079	0.0074
CHLOROMETHANE	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001	
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	0.001	<0.001
ETHYL METHACRYLATE			<0.01
ETHYLENE	<0.001	<0.001	<0.001
IODOMETHANE			<0.01
TOTAL XYLENE			<0.001
M-XYLENE	<0.001	<0.001	
O-XYLENE	<0.001	<0.001	
P-XYLENE	<0.001	<0.001	
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0011	0.00097	0.00074
TOLUENE	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.0005
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE			<0.01
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	<0.001	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.001	
1,2,4-TRIMETHYLBENZENE	<0.001	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	
1,2-DICHLOROBENZENE	<0.001	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

	38	38	38
SITE CODE	38	38	38
SAMPLE DATE	05/03/90	05/03/90	01/22/92
SAMPLE TIME	13:10	13:40	14:15
LAB	EL	EL	EL
LAB NUMBER	90-10821	90-10833	92-4691
REMARKS		DUPLICATE	
SAMPLE NUMBER	HL-9005-104	HL-9005-204	HL-9201-108

-- SEMI-VOLATILE EXTRACTABLES --

1,3,5-TRIMETHYLBENZENE	<0.001	<0.001	
1,3-DICHLOROBENZENE	<0.001	<0.001	
1,3-DICHLOROPROPANE	<0.001	<0.001	
1,4-DICHLOROBENZENE	<0.0005	<0.0005	
1,4-DIFLUOROBENZENE			<0.01
DICHLOROMONOFUOROMETHANE	<0.001	<0.001	
HEXACHLOROBUTADIENE	<0.001	<0.001	
ISOPROPYLBENZENE	<0.001	<0.001	
N-BUTYLBENZENE	<0.001	<0.001	
N-PROPYLBENZENE	<0.001	<0.001	
NAPHTHALENE	<0.001	<0.001	
P-ISOPROPYLTOLUENE	<0.001	<0.001	
SEC-BUTYLBENZENE	<0.001	<0.001	
TERT-BUTYLBENZENE	<0.001	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

	40	40	40	40	40	40	40
SITE CODE	40	40	40	40	40	40	40
SAMPLE DATE	05/06/90	04/13/91	05/28/92	12/02/92	05/28/93	01/04/94	04/18/94
SAMPLE TIME	12:15	13:40		10:35		13:45	
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-10831	91-13086	92-19787	92-50586	93-21829	94-3391	94-16471
SAMPLE NUMBER	HL-9005-114	HL-9104-109	HL-9205-118	HL-9212-905	HL-10	HL-104H2	HL-10
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE	<0.001					<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.0013	0.001	0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	0.0015	0.0012	0.0013	0.0011	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001						
1,2-DIBROMOETHANE	<0.001					<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001					<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001						
2-BUTANONE (METHYL-ETHYL-KETONE)		<0.01					
2-CHLOROETHYL VINYL ETHER		<0.01	<0.01	<0.001	<0.001		
2-CHLOROTOLUENE	<0.001						
2-HEXANONE		<0.01				<0.02	<0.02
4-BROMOFLUOROBENZENE		<0.01	<0.01	<0.01	<0.01		
4-CHLOROTOLUENE	<0.001						
4-METHYL-2-PENTANONE		<0.01					
ACETONE		<0.01				<0.02	<0.05
ACROLEIN		<0.01					
ACRYLONITRILE		<0.01				<0.02	<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
BROMOBENZENE	<0.001						
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.01				<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.011	0.011	0.0091	0.0075	0.0056	0.0057	0.0057
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	0.002					0.0014	0.0013
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0045	0.0021	0.0014	0.0024	0.0015	0.0014	0.002
DICHLOROFLUOROMETHANE							0.024
ETHANOL		<0.01					
ETHYL METHACRYLATE		<0.01	<0.01	<0.001	<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE		<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE		<0.001	<0.001	<0.001	<0.001	<0.001	
M-XYLENE	<0.001						
O-XYLENE	<0.001					<0.001	<0.001
P-XYLENE	<0.001						
METHYL ETHYL KETONE						<0.02	<0.02
METHYL ISOBUTYL KETONE						<0.02	<0.02
METHYLENE CHLORIDE	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.008	0.0056	0.0046	0.0071	0.0036	0.0051	0.0038
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	0.0013	0.00088	0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	40	40	40	40	40	40	40
SAMPLE DATE	05/06/90	04/13/91	05/28/92	12/02/92	05/28/93	01/04/94	04/18/94
SAMPLE TIME	12:15	13:40		10:35		13:45	
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-10831	91-13086	92-19787	92-50586	93-21829	94-3391	94-16471
SAMPLE NUMBER	HL-9005-114	HL-9104-109	HL-9205-118	HL-9212-905	HL-10	HL-104H2	HL-10

-- VOLATILE ORGANICS --

VINYL ACETATE		<0.01	<0.01	<0.02	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001						
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001						
1,2,4-TRIMETHYLBENZENE	<0.001						
1,2-DIBROMO-3-CHLOROPROPANE	<0.001					<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001					<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001						
1,3-DICHLOROBENZENE	<0.001						
1,3-DICHLOROPROPANE	<0.001						
TRANS-1,4-DICHLORO-2-BUTENE							<0.002
1,4-DICHLORO-2-BUTENE		<0.01					<0.002
1,4-DICHLOROBENZENE	<0.0005					<0.001	<0.001
1,4-DIFLUOROBENZENE		<0.01	<0.01	<0.001	<0.001		
DICHLOROMONOFUOROMETHANE	0.0041						
HEXACHLOROBUTADIENE	<0.001						
ISOPROPYLBENZENE	<0.001						
N-BUTYLBENZENE	<0.001						
N-PROPYLBENZENE	<0.001						
NAPHTHALENE	<0.001						
P-ISOPROPYLTOLUENE	<0.001						
SEC-BUTYLBENZENE	<0.001						
TERT-BUTYLBENZENE	<0.001						

-- HYDROCARBONS --

M+P-XYLENE							<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	40	40
SAMPLE DATE	08/25/94	12/08/94
SAMPLE TIME	08:15	
LAB	EL	HYDRO
LAB NUMBER	94-40378	
REMARKS		NO SAMPLE
SAMPLE NUMBER	HL-9408-112	HL-9412-102

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)	PUMPING
PH (FLD)	7.13
SC (UMHOS/CM AT 25 C) (FLD)	1283.0
WATER TEMPERATURE (C) (FLD)	11.3

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.001
1,2-DICHLOROPROPANE	<0.001
2-HEXANONE	<0.02
ACETONE	<0.05
ACRYLONITRILE	<0.02
BENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON DISULFIDE	<0.001
CARBON TETRACHLORIDE	<0.001
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0051
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	0.0014
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
IODOMETHANE	<0.001
O-XYLENE	<0.001
METHYL ETHYL KETONE	<0.02
METHYL ISOBUTYL KETONE	<0.02
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	0.0036
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.001
TRICHLOROFLUOROMETHANE	<0.001
VINYL ACETATE	<0.001
VINYL CHLORIDE	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002
1,4-DICHLOROBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	40	40
SAMPLE DATE	08/25/94	12/08/94
SAMPLE TIME	08:15	
LAB	EL	HYDRO
LAB NUMBER	94-40378	
REMARKS		NO SAMPLE
SAMPLE NUMBER	HL-9408-112	HL-9412-102

-- HYDROCARBONS --

M+P-XYLENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

1961	1962	1963
1964	1965	1966
1967	1968	1969
1970	1971	1972
1973	1974	1975
1976	1977	1978
1979	1980	1981
1982	1983	1984
1985	1986	1987
1988	1989	1990
1991	1992	1993
1994	1995	1996
1997	1998	1999
2000	2001	2002
2003	2004	2005
2006	2007	2008
2009	2010	2011
2012	2013	2014
2015	2016	2017
2018	2019	2020
2021	2022	2023
2024	2025	2026
2027	2028	2029
2030	2031	2032
2033	2034	2035
2036	2037	2038
2039	2040	2041
2042	2043	2044
2045	2046	2047
2048	2049	2050
2051	2052	2053
2054	2055	2056
2057	2058	2059
2060	2061	2062
2063	2064	2065
2066	2067	2068
2069	2070	2071
2072	2073	2074
2075	2076	2077
2078	2079	2080
2081	2082	2083
2084	2085	2086
2087	2088	2089
2090	2091	2092
2093	2094	2095
2096	2097	2098
2099	2100	2101
2102	2103	2104
2105	2106	2107
2108	2109	2110
2111	2112	2113
2114	2115	2116
2117	2118	2119
2120	2121	2122
2123	2124	2125
2126	2127	2128
2129	2130	2131
2132	2133	2134
2135	2136	2137
2138	2139	2140
2141	2142	2143
2144	2145	2146
2147	2148	2149
2150	2151	2152
2153	2154	2155
2156	2157	2158
2159	2160	2161
2162	2163	2164
2165	2166	2167
2168	2169	2170
2171	2172	2173
2174	2175	2176
2177	2178	2179
2180	2181	2182
2183	2184	2185
2186	2187	2188
2189	2190	2191
2192	2193	2194
2195	2196	2197
2198	2199	2200
2201	2202	2203
2204	2205	2206
2207	2208	2209
2210	2211	2212
2213	2214	2215
2216	2217	2218
2219	2220	2221
2222	2223	2224
2225	2226	2227
2228	2229	2230
2231	2232	2233
2234	2235	2236
2237	2238	2239
2240	2241	2242
2243	2244	2245
2246	2247	2248
2249	2250	2251
2252	2253	2254
2255	2256	2257
2258	2259	2260
2261	2262	2263
2264	2265	2266
2267	2268	2269
2270	2271	2272
2273	2274	2275
2276	2277	2278
2279	2280	2281
2282	2283	2284
2285	2286	2287
2288	2289	2290
2291	2292	2293
2294	2295	2296
2297	2298	2299
2300	2301	2302
2303	2304	2305
2306	2307	2308
2309	2310	2311
2312	2313	2314
2315	2316	2317
2318	2319	2320
2321	2322	2323
2324	2325	2326
2327	2328	2329
2330	2331	2332
2333	2334	2335
2336	2337	2338
2339	2340	2341
2342	2343	2344
2345	2346	2347
2348	2349	2350
2351	2352	2353
2354	2355	2356
2357	2358	2359
2360	2361	2362
2363	2364	2365
2366	2367	2368
2369	2370	2371
2372	2373	2374
2375	2376	2377
2378	2379	2380
2381	2382	2383
2384	2385	2386
2387	2388	2389
2390	2391	2392
2393	2394	2395
2396	2397	2398
2399	2400	2401
2402	2403	2404
2405	2406	2407
2408	2409	2410
2411	2412	2413
2414	2415	2416
2417	2418	2419
2420	2421	2422
2423	2424	2425
2426	2427	2428
2429	2430	2431
2432	2433	2434
2435	2436	2437
2438	2439	2440
2441	2442	2443
2444	2445	2446
2447	2448	2449
2450	2451	2452
2453	2454	2455
2456	2457	2458
2459	2460	2461
2462	2463	2464
2465	2466	2467
2468	2469	2470
2471	2472	2473
2474	2475	2476
2477	2478	2479
2480	2481	2482
2483	2484	2485
2486	2487	2488
2489	2490	2491
2492	2493	2494
2495	2496	2497
2498	2499	2500

1961-1962

1963-1964

1965-1966

1967-1968

1969-1970

1971-1972

1973-1974

1975-1976

1977-1978

1979-1980

1981-1982

1983-1984

1985-1986

1987-1988

1989-1990

1991-1992

1993-1994

1995-1996

1997-1998

1999-2000

2001-2002

2003-2004

2005-2006

2007-2008

Sample Type: Private Well

SITE CODE 42
 SAMPLE DATE 05/03/90
 SAMPLE TIME 12:20
 LAB EL
 LAB NUMBER 90-10819
 SAMPLE NUMBER HL-9005-102

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE 0.00089
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,1-DICHLOROPROPENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.0005
 1,2-DICHLOROPROPANE <0.001
 2,2-DICHLOROPROPANE <0.001
 2-CHLOROTOLUENE <0.001
 4-CHLOROTOLUENE <0.001
 BENZENE <0.0005
 BROMOBENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON TETRACHLORIDE <0.0005
 CHLOROETHANE <0.001
 CHLOROFORM 0.0028
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE 0.0046
 ETHYLBENZENE <0.001
 M-XYLENE <0.001
 O-XYLENE <0.001
 P-XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE 0.005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE 0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE <0.001
 1,2,3-TRICHLOROPROPANE <0.001
 1,2,4-TRICHLOROBENZENE <0.001
 1,2,4-TRIMETHYLBENZENE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.001
 1,2-DICHLOROBENZENE <0.001
 1,3,5-TRIMETHYLBENZENE <0.001
 1,3-DICHLOROBENZENE <0.001
 1,3-DICHLOROPROPANE <0.001
 1,4-DICHLOROBENZENE <0.0005
 DICHLOROMONOFUOROMETHANE 0.0024
 HEXACHLOROBUTADIENE <0.001
 ISOPROPYLBENZENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

LANDS IN THE STATE OF TEXAS

SECTION	TOWNSHIP	RANGE	COUNTY	ACRES	OWNER
1	10	10	10	10	10
2	10	10	10	10	10
3	10	10	10	10	10
4	10	10	10	10	10
5	10	10	10	10	10
6	10	10	10	10	10
7	10	10	10	10	10
8	10	10	10	10	10
9	10	10	10	10	10
10	10	10	10	10	10
11	10	10	10	10	10
12	10	10	10	10	10
13	10	10	10	10	10
14	10	10	10	10	10
15	10	10	10	10	10
16	10	10	10	10	10
17	10	10	10	10	10
18	10	10	10	10	10
19	10	10	10	10	10
20	10	10	10	10	10
21	10	10	10	10	10
22	10	10	10	10	10
23	10	10	10	10	10
24	10	10	10	10	10
25	10	10	10	10	10
26	10	10	10	10	10
27	10	10	10	10	10
28	10	10	10	10	10
29	10	10	10	10	10
30	10	10	10	10	10
31	10	10	10	10	10
32	10	10	10	10	10
33	10	10	10	10	10
34	10	10	10	10	10
35	10	10	10	10	10
36	10	10	10	10	10
37	10	10	10	10	10
38	10	10	10	10	10
39	10	10	10	10	10
40	10	10	10	10	10
41	10	10	10	10	10
42	10	10	10	10	10
43	10	10	10	10	10
44	10	10	10	10	10
45	10	10	10	10	10
46	10	10	10	10	10
47	10	10	10	10	10
48	10	10	10	10	10
49	10	10	10	10	10
50	10	10	10	10	10
51	10	10	10	10	10
52	10	10	10	10	10
53	10	10	10	10	10
54	10	10	10	10	10
55	10	10	10	10	10
56	10	10	10	10	10
57	10	10	10	10	10
58	10	10	10	10	10
59	10	10	10	10	10
60	10	10	10	10	10
61	10	10	10	10	10
62	10	10	10	10	10
63	10	10	10	10	10
64	10	10	10	10	10
65	10	10	10	10	10
66	10	10	10	10	10
67	10	10	10	10	10
68	10	10	10	10	10
69	10	10	10	10	10
70	10	10	10	10	10
71	10	10	10	10	10
72	10	10	10	10	10
73	10	10	10	10	10
74	10	10	10	10	10
75	10	10	10	10	10
76	10	10	10	10	10
77	10	10	10	10	10
78	10	10	10	10	10
79	10	10	10	10	10
80	10	10	10	10	10
81	10	10	10	10	10
82	10	10	10	10	10
83	10	10	10	10	10
84	10	10	10	10	10
85	10	10	10	10	10
86	10	10	10	10	10
87	10	10	10	10	10
88	10	10	10	10	10
89	10	10	10	10	10
90	10	10	10	10	10
91	10	10	10	10	10
92	10	10	10	10	10
93	10	10	10	10	10
94	10	10	10	10	10
95	10	10	10	10	10
96	10	10	10	10	10
97	10	10	10	10	10
98	10	10	10	10	10
99	10	10	10	10	10
100	10	10	10	10	10

Sample Type: Private Well

SITE CODE	42
SAMPLE DATE	05/03/90
SAMPLE TIME	12:20
LAB	EL
LAB NUMBER	90-10819
SAMPLE NUMBER	HL-9005-102

-- SEMI-VOLATILE EXTRACTABLES --

N-BUTYLBENZENE	<0.001
N-PROPYLBENZENE	<0.001
NAPHTHALENE	<0.001
P-ISOPROPYLTOLUENE	<0.001
SEC-BUTYLBENZENE	<0.001
TERT-BUTYLBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Table 1: Summary of Data

Year	Value
1990	100
1991	110
1992	120
1993	130
1994	140
1995	150
1996	160
1997	170
1998	180
1999	190
2000	200

Year	Value
2001	210
2002	220
2003	230
2004	240
2005	250
2006	260
2007	270
2008	280
2009	290
2010	300

Year	Value
2011	310
2012	320
2013	330
2014	340
2015	350
2016	360
2017	370
2018	380
2019	390
2020	400

Year	Value
2021	410
2022	420
2023	430
2024	440
2025	450
2026	460
2027	470
2028	480
2029	490
2030	500

Year	Value
2031	510
2032	520
2033	530
2034	540
2035	550
2036	560
2037	570
2038	580
2039	590
2040	600

Year	Value
2041	610
2042	620
2043	630
2044	640
2045	650
2046	660
2047	670
2048	680
2049	690
2050	700

Year	Value
2051	710
2052	720
2053	730
2054	740
2055	750
2056	760
2057	770
2058	780
2059	790
2060	800

Year	Value
2061	810
2062	820
2063	830
2064	840
2065	850
2066	860
2067	870
2068	880
2069	890
2070	900

Year	Value
2071	910
2072	920
2073	930
2074	940
2075	950
2076	960
2077	970
2078	980
2079	990
2080	1000

Sample Type: Private Well

SITE CODE	45	45
SAMPLE DATE	04/18/94	08/25/94
SAMPLE TIME		10:45
LAB	EL	EL
LAB NUMBER	94-16464	94-40762
SAMPLE NUMBER	HL-3	HL-9408-111

-- PHYSICAL PARAMETERS --

DEPTH TO WATER LEVEL (FEET)		PUMPING
PH (FLD)		7.28
SC (UMHOS/CM AT 25 C) (FLD)		1028.0
WATER TEMPERATURE (C) (FLD)		12.1

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2-HEXANONE	<0.02	<0.02
ACETONE	<0.05	<0.05
ACRYLONITRILE	<0.02	<0.02
BENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	0.0015	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE	<0.001	0.0012
CARBON TETRACHLORIDE	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.02	0.0049
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
DICHLOROFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
METHYL ETHYL KETONE		<0.02
METHYL ETHYL KETONE	<0.02	
METHYL ISOBUTYL KETONE	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.001	0.0016
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002	<0.002

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	45	45
SAMPLE DATE	04/18/94	08/25/94
SAMPLE TIME		10:45
LAB	EL	EL
LAB NUMBER	94-16464	94-40762
SAMPLE NUMBER	HL-3	HL-9408-111

-- SEMI-VOLATILE EXTRACTABLES --

1,4-DICHLORO-2-BUTENE	<0.002	
1,4-DICHLOROBENZENE	<0.001	<0.001

-- HYDROCARBONS --

M+P-XYLENE	<0.001	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

DATE	AMOUNT	REMARKS
1890	100.00	PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE
1891	200.00	PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE
1892	300.00	PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE
1893	400.00	PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE
1894	500.00	PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE

PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE

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PAID TO THE COMMISSIONER OF THE GENERAL LAND OFFICE

Sample Type: Private Well

SITE CODE	47
SAMPLE DATE	01/22/92
SAMPLE TIME	13:05
LAB	EL
LAB NUMBER	92-4689
SAMPLE NUMBER	HL-9201-106

-- VOLATILE ORGANICS --

1,1,1-TRICHLOROETHANE	0.00061
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.0005
1,2-DICHLOROETHANE	<0.0005
2-CHLOROETHYL VINYL ETHER	<0.01
4-BROMOFLUOROBENZENE	<0.01
BENZENE	<0.0005
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.0005
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0032
CHLOROMETHANE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	0.001
ETHYL METHACRYLATE	<0.01
ETHYLBENZENE	<0.001
IODOMETHANE	<0.01
TOTAL XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	0.0013
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.0005
TRICHLOROFLUOROMETHANE	<0.001
VINYL ACETATE	<0.01
VINYL CHLORIDE	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001
1,4-DIFLUOROBENZENE	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	48	48
SAMPLE DATE	06/01/90	05/20/92
SAMPLE TIME	13:30	11:30
LAB	EL	EL
LAB NUMBER	90-14925	92-19279
SAMPLE NUMBER	HL-0690-200	HL-9205-110

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	
1,1,1-TRICHLOROETHANE	0.00067	0.00054
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005
1,1-DICHLOROPROPENE	<0.001	
1,2-DIBROMOETHANE	<0.001	
1,2-DICHLOROETHANE	<0.0005	<0.0005
1,2-DICHLOROPROPANE	<0.001	
2,2-DICHLOROPROPANE	<0.001	
2-CHLOROETHYL VINYL ETHER		<0.01
2-CHLOROTOLUENE	<0.001	
4-BROMOFLUOROBENZENE		<0.01
4-CHLOROTOLUENE	<0.001	
BENZENE	<0.0005	<0.0005
BROMOBENZENE	<0.001	
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.0016	0.0015
CHLORMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.001	0.0011
ETHYL METHACRYLATE		<0.01
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE		<0.01
TOTAL XYLENE		<0.001
M-XYLENE	<0.001	
O-XYLENE	<0.001	
P-XYLENE	<0.001	
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	0.0017	0.0013
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005
TRICHLOROFUOROMETHANE	<0.001	<0.001
VINYL ACETATE		<0.01
VINYL CHLORIDE	<0.0005	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	
1,2,4-TRIMETHYLBENZENE	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	
1,2-DICHLOROBENZENE	<0.001	
1,3,5-TRIMETHYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	48	48
SAMPLE DATE	06/01/90	05/20/92
SAMPLE TIME	13:30	11:30
LAB	EL	EL
LAB NUMBER	90-14925	92-19279
SAMPLE NUMBER	HL-0690-200	HL-9205-110

-- SEMI-VOLATILE EXTRACTABLES --

1,3-DICHLOROBENZENE	<0.001	
1,3-DICHLOROPROPANE	<0.001	
1,4-DICHLOROBENZENE	<0.0005	
1,4-DIFLUOROBENZENE		<0.01
DICHLOROMONOFUOROMETHANE	<0.001	
HEXACHLOROBUTADIENE	<0.001	
ISOPROPYLBENZENE	<0.001	
N-BUTYLBENZENE	<0.001	
N-PROPYLBENZENE	<0.001	
NAPHTHALENE	<0.001	
P-ISOPROPYLTOLUENE	<0.001	
SEC-BUTYLBENZENE	<0.001	
TERT-BUTYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	51	51
SAMPLE DATE	06/01/90	04/18/94
SAMPLE TIME	13:50	
LAB	EL	EL
LAB NUMBER	90-14926	94-16462
SAMPLE NUMBER	HL-0690-201	HL-1

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.00054	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001
1,1-DICHLOROPROPENE	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	
2-CHLOROTOLUENE	<0.001	
2-HEXANONE		<0.02
4-CHLOROTOLUENE	<0.001	
ACETONE		<0.05
ACRYLONITRILE		<0.02
BENZENE	<0.0005	<0.001
BROMOBENZENE	<0.001	
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON DISULFIDE		<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	0.0023	0.0047
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0018	0.0022
DICHLOROFLUOROMETHANE		0.011
ETHYLBENZENE	<0.001	<0.001
IODOMETHANE		<0.001
M-XYLENE	<0.001	
O-XYLENE	<0.001	<0.001
P-XYLENE	<0.001	
METHYL ETHYL KETONE		<0.02
METHYL ISOBUTYL KETONE		<0.02
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	0.0017	0.0016
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL ACETATE		<0.001
VINYL CHLORIDE	<0.0005	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	
1,2,4-TRIMETHYLBENZENE	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	51	51
SAMPLE DATE	06/01/90	04/18/94
SAMPLE TIME	13:50	
LAB	EL	EL
LAB NUMBER	90-14926	94-16462
SAMPLE NUMBER	HL-0690-201	HL-1

-- SEMI-VOLATILE EXTRACTABLES --

1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001	
1,3-DICHLOROBENZENE	<0.001	
1,3-DICHLOROPROPANE	<0.001	
TRANS-1,4-DICHLORO-2-BUTENE		<0.002
1,4-DICHLORO-2-BUTENE		<0.002
1,4-DICHLOROBENZENE	<0.0005	<0.001
DICHLOROMONOFUOROMETHANE	<0.001	
HEXACHLOROBUTADIENE	<0.001	
ISOPROPYLBENZENE	<0.001	
N-BUTYLBENZENE	<0.001	
N-PROPYLBENZENE	<0.001	
NAPHTHALENE	<0.001	
P-ISOPROPYLTOLUENE	<0.001	
SEC-BUTYLBENZENE	<0.001	
TERT-BUTYLBENZENE	<0.001	

-- HYDROCARBONS --

M+P-XYLENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	52	52	52	52	52	52	52
SAMPLE DATE	04/04/91	05/28/92	12/01/92	12/01/92	05/26/93	05/26/93	01/04/94
SAMPLE TIME	13:30		08:15	08:30			14:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12765	92-19789	92-50581	92-50582	93-21822	93-21823	94-3393
SAMPLE NUMBER	HL-9104-102	HL-9205-114	HL-9212-900	HL-9212-901	HL-3	HL-4	HL-104E5
-- VOLATILE ORGANICS --							
1,1,1,2-TETRACHLOROETHANE							<0.001
1,1,1-TRICHLOROETHANE	0.0006	0.00096	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE							<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE							<0.001
2-BUTANONE (METHYL-ETHYL-KETONE)	<0.01						
2-CHLOROETHYL VINYL ETHER	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	
2-HEXANONE	<0.01						<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
4-METHYL-2-PENTANONE	<0.01						
ACETONE	<0.01						<0.02
ACROLEIN	<0.01						
ACRYLONITRILE	<0.01						<0.02
BENZENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE	<0.01						<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0043	0.007	0.004	0.0085	0.0053	0.0053	0.0051
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE							<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0032	0.0031	0.0012	0.0037	0.003	0.0023	0.0014
ETHANOL	<0.01						
ETHYL METHACRYLATE	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
O-XYLENE							<0.001
METHYL ETHYL KETONE							<0.02
METHYL ISOBUTYL KETONE							<0.02
METHYLENE CHLORIDE	<0.001	<0.001	0.0035	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0022	0.0025	0.002	0.0041	0.0028	0.0027	0.0019
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFUOROMETHANE	<0.001	0.0018	<0.001	0.0011	<0.001	<0.001	<0.001
VINYL ACETATE	<0.01	<0.01	<0.02	<0.02	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE							<0.001
1,2-DICHLOROBENZENE							<0.001
1,4-DICHLORO-2-BUTENE	<0.01						<0.002

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

	52	52	52	52	52	52	52
SITE CODE	52	52	52	52	52	52	52
SAMPLE DATE	04/04/91	05/28/92	12/01/92	12/01/92	05/26/93	05/26/93	01/04/94
SAMPLE TIME	13:30		08:15	08:30			14:55
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	91-12765	92-19789	92-50581	92-50582	93-21822	93-21823	94-3393
SAMPLE NUMBER	HL-9104-102	HL-9205-114	HL-9212-900	HL-9212-901	HL-3	HL-4	HL-104E5

-- SEMI-VOLATILE EXTRACTABLES --

1,4-DICHLOROBENZENE							<0.001
1,4-DIFLUOROBENZENE	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Exhibit A - Summary of Findings

Item	1	2	3	4	5	6	7
1. Summary of Findings	1.1	1.2	1.3	1.4	1.5	1.6	1.7
2. Summary of Findings	2.1	2.2	2.3	2.4	2.5	2.6	2.7
3. Summary of Findings	3.1	3.2	3.3	3.4	3.5	3.6	3.7
4. Summary of Findings	4.1	4.2	4.3	4.4	4.5	4.6	4.7
5. Summary of Findings	5.1	5.2	5.3	5.4	5.5	5.6	5.7
6. Summary of Findings	6.1	6.2	6.3	6.4	6.5	6.6	6.7
7. Summary of Findings	7.1	7.2	7.3	7.4	7.5	7.6	7.7
8. Summary of Findings	8.1	8.2	8.3	8.4	8.5	8.6	8.7
9. Summary of Findings	9.1	9.2	9.3	9.4	9.5	9.6	9.7
10. Summary of Findings	10.1	10.2	10.3	10.4	10.5	10.6	10.7
11. Summary of Findings	11.1	11.2	11.3	11.4	11.5	11.6	11.7
12. Summary of Findings	12.1	12.2	12.3	12.4	12.5	12.6	12.7
13. Summary of Findings	13.1	13.2	13.3	13.4	13.5	13.6	13.7
14. Summary of Findings	14.1	14.2	14.3	14.4	14.5	14.6	14.7
15. Summary of Findings	15.1	15.2	15.3	15.4	15.5	15.6	15.7
16. Summary of Findings	16.1	16.2	16.3	16.4	16.5	16.6	16.7
17. Summary of Findings	17.1	17.2	17.3	17.4	17.5	17.6	17.7
18. Summary of Findings	18.1	18.2	18.3	18.4	18.5	18.6	18.7
19. Summary of Findings	19.1	19.2	19.3	19.4	19.5	19.6	19.7
20. Summary of Findings	20.1	20.2	20.3	20.4	20.5	20.6	20.7
21. Summary of Findings	21.1	21.2	21.3	21.4	21.5	21.6	21.7
22. Summary of Findings	22.1	22.2	22.3	22.4	22.5	22.6	22.7
23. Summary of Findings	23.1	23.2	23.3	23.4	23.5	23.6	23.7
24. Summary of Findings	24.1	24.2	24.3	24.4	24.5	24.6	24.7
25. Summary of Findings	25.1	25.2	25.3	25.4	25.5	25.6	25.7
26. Summary of Findings	26.1	26.2	26.3	26.4	26.5	26.6	26.7
27. Summary of Findings	27.1	27.2	27.3	27.4	27.5	27.6	27.7
28. Summary of Findings	28.1	28.2	28.3	28.4	28.5	28.6	28.7
29. Summary of Findings	29.1	29.2	29.3	29.4	29.5	29.6	29.7
30. Summary of Findings	30.1	30.2	30.3	30.4	30.5	30.6	30.7
31. Summary of Findings	31.1	31.2	31.3	31.4	31.5	31.6	31.7
32. Summary of Findings	32.1	32.2	32.3	32.4	32.5	32.6	32.7
33. Summary of Findings	33.1	33.2	33.3	33.4	33.5	33.6	33.7
34. Summary of Findings	34.1	34.2	34.3	34.4	34.5	34.6	34.7
35. Summary of Findings	35.1	35.2	35.3	35.4	35.5	35.6	35.7
36. Summary of Findings	36.1	36.2	36.3	36.4	36.5	36.6	36.7
37. Summary of Findings	37.1	37.2	37.3	37.4	37.5	37.6	37.7
38. Summary of Findings	38.1	38.2	38.3	38.4	38.5	38.6	38.7
39. Summary of Findings	39.1	39.2	39.3	39.4	39.5	39.6	39.7
40. Summary of Findings	40.1	40.2	40.3	40.4	40.5	40.6	40.7
41. Summary of Findings	41.1	41.2	41.3	41.4	41.5	41.6	41.7
42. Summary of Findings	42.1	42.2	42.3	42.4	42.5	42.6	42.7
43. Summary of Findings	43.1	43.2	43.3	43.4	43.5	43.6	43.7
44. Summary of Findings	44.1	44.2	44.3	44.4	44.5	44.6	44.7
45. Summary of Findings	45.1	45.2	45.3	45.4	45.5	45.6	45.7
46. Summary of Findings	46.1	46.2	46.3	46.4	46.5	46.6	46.7
47. Summary of Findings	47.1	47.2	47.3	47.4	47.5	47.6	47.7
48. Summary of Findings	48.1	48.2	48.3	48.4	48.5	48.6	48.7
49. Summary of Findings	49.1	49.2	49.3	49.4	49.5	49.6	49.7
50. Summary of Findings	50.1	50.2	50.3	50.4	50.5	50.6	50.7
51. Summary of Findings	51.1	51.2	51.3	51.4	51.5	51.6	51.7
52. Summary of Findings	52.1	52.2	52.3	52.4	52.5	52.6	52.7
53. Summary of Findings	53.1	53.2	53.3	53.4	53.5	53.6	53.7
54. Summary of Findings	54.1	54.2	54.3	54.4	54.5	54.6	54.7
55. Summary of Findings	55.1	55.2	55.3	55.4	55.5	55.6	55.7
56. Summary of Findings	56.1	56.2	56.3	56.4	56.5	56.6	56.7
57. Summary of Findings	57.1	57.2	57.3	57.4	57.5	57.6	57.7
58. Summary of Findings	58.1	58.2	58.3	58.4	58.5	58.6	58.7
59. Summary of Findings	59.1	59.2	59.3	59.4	59.5	59.6	59.7
60. Summary of Findings	60.1	60.2	60.3	60.4	60.5	60.6	60.7
61. Summary of Findings	61.1	61.2	61.3	61.4	61.5	61.6	61.7
62. Summary of Findings	62.1	62.2	62.3	62.4	62.5	62.6	62.7
63. Summary of Findings	63.1	63.2	63.3	63.4	63.5	63.6	63.7
64. Summary of Findings	64.1	64.2	64.3	64.4	64.5	64.6	64.7
65. Summary of Findings	65.1	65.2	65.3	65.4	65.5	65.6	65.7
66. Summary of Findings	66.1	66.2	66.3	66.4	66.5	66.6	66.7
67. Summary of Findings	67.1	67.2	67.3	67.4	67.5	67.6	67.7
68. Summary of Findings	68.1	68.2	68.3	68.4	68.5	68.6	68.7
69. Summary of Findings	69.1	69.2	69.3	69.4	69.5	69.6	69.7
70. Summary of Findings	70.1	70.2	70.3	70.4	70.5	70.6	70.7
71. Summary of Findings	71.1	71.2	71.3	71.4	71.5	71.6	71.7
72. Summary of Findings	72.1	72.2	72.3	72.4	72.5	72.6	72.7
73. Summary of Findings	73.1	73.2	73.3	73.4	73.5	73.6	73.7
74. Summary of Findings	74.1	74.2	74.3	74.4	74.5	74.6	74.7
75. Summary of Findings	75.1	75.2	75.3	75.4	75.5	75.6	75.7
76. Summary of Findings	76.1	76.2	76.3	76.4	76.5	76.6	76.7
77. Summary of Findings	77.1	77.2	77.3	77.4	77.5	77.6	77.7
78. Summary of Findings	78.1	78.2	78.3	78.4	78.5	78.6	78.7
79. Summary of Findings	79.1	79.2	79.3	79.4	79.5	79.6	79.7
80. Summary of Findings	80.1	80.2	80.3	80.4	80.5	80.6	80.7
81. Summary of Findings	81.1	81.2	81.3	81.4	81.5	81.6	81.7
82. Summary of Findings	82.1	82.2	82.3	82.4	82.5	82.6	82.7
83. Summary of Findings	83.1	83.2	83.3	83.4	83.5	83.6	83.7
84. Summary of Findings	84.1	84.2	84.3	84.4	84.5	84.6	84.7
85. Summary of Findings	85.1	85.2	85.3	85.4	85.5	85.6	85.7
86. Summary of Findings	86.1	86.2	86.3	86.4	86.5	86.6	86.7
87. Summary of Findings	87.1	87.2	87.3	87.4	87.5	87.6	87.7
88. Summary of Findings	88.1	88.2	88.3	88.4	88.5	88.6	88.7
89. Summary of Findings	89.1	89.2	89.3	89.4	89.5	89.6	89.7
90. Summary of Findings	90.1	90.2	90.3	90.4	90.5	90.6	90.7
91. Summary of Findings	91.1	91.2	91.3	91.4	91.5	91.6	91.7
92. Summary of Findings	92.1	92.2	92.3	92.4	92.5	92.6	92.7
93. Summary of Findings	93.1	93.2	93.3	93.4	93.5	93.6	93.7
94. Summary of Findings	94.1	94.2	94.3	94.4	94.5	94.6	94.7
95. Summary of Findings	95.1	95.2	95.3	95.4	95.5	95.6	95.7
96. Summary of Findings	96.1	96.2	96.3	96.4	96.5	96.6	96.7
97. Summary of Findings	97.1	97.2	97.3	97.4	97.5	97.6	97.7
98. Summary of Findings	98.1	98.2	98.3	98.4	98.5	98.6	98.7
99. Summary of Findings	99.1	99.2	99.3	99.4	99.5	99.6	99.7
100. Summary of Findings	100.1	100.2	100.3	100.4	100.5	100.6	100.7

Sample Type: Private Well

SITE CODE 57
 SAMPLE DATE 12/08/94
 SAMPLE TIME 09:15
 LAB EL
 LAB NUMBER 94-60432
 SAMPLE NUMBER HL-9412-103

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.001
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.001
 1,2-DICHLOROPROPANE <0.001
 2-HEXANONE <0.02
 ACETONE <0.05
 ACRYLONITRILE <0.02
 BENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON DISULFIDE 0.0021
 CARBON TETRACHLORIDE <0.001
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM 0.0018
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE 0.0012
 ETHYLBENZENE <0.001
 IODOMETHANE <0.001
 O-XYLENE <0.001
 METHYL ETHYL KETONE <0.02
 METHYL ISOBUTYL KETONE <0.02
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE 0.0015
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.001
 TRICHLOROFLUOROMETHANE <0.001
 VINYL ACETATE <0.001
 VINYL CHLORIDE <0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.005
 1,2-DICHLOROBENZENE <0.001
 TRANS-1,4-DICHLORO-2-BUTENE <0.002
 1,4-DICHLOROBENZENE <0.001

-- HYDROCARBONS --

M+P-XYLENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

APPENDIX A: WATER QUALITY ANALYSES SUMMARY REPORT (1989 THROUGH 1994)

DataMan Program

Sample Type: Private Well

	SITE CODE	59	59	59	59	59	59	59
	SAMPLE DATE	06/01/90	04/04/91	01/22/92	05/20/92	12/01/92	05/26/93	01/04/94
	SAMPLE TIME	14:50	14:00	11:40	10:20	13:15		14:00
	LAB	EL	EL	EL	EL	EL	EL	EL
	LAB NUMBER	90-14927	91-12766	92-4688	92-19277	92-50583	93-21824	94-3394
	SAMPLE NUMBER	HL-0690-202	HL-9104-103	HL-9201-105	HL-9205-102	HL-9212-902	HL-5	HL-104S3
-- VOLATILE ORGANICS --								
1,1,1,2-TETRACHLOROETHANE	<0.001							<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	0.00051	<0.0005	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001							
1,2-DIBROMOETHANE	<0.001							<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001							<0.001
2,2-DICHLOROPROPANE	<0.001							
2-BUTANONE (METHYL-ETHYL-KETONE)		<0.01						
2-CHLOROETHYL VINYL ETHER		<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	
2-CHLOROTOLUENE	<0.001							
2-HEXANONE		<0.01						<0.02
4-BROMOFLUOROBENZENE		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
4-CHLOROTOLUENE	<0.001							
4-METHYL-2-PENTANONE		<0.01						
ACETONE		<0.01						<0.02
ACROLEIN		<0.01						
ACRYLONITRILE		<0.01						<0.02
BENZENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
BROMOBENZENE	<0.001							
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.01						<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	0.0016	0.0018	0.0013	0.0013	0.0042	0.0014	0.0015	0.0015
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001							<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	0.0013	0.0024	0.0018	0.0026	0.0023	0.002	<0.001	<0.001
ETHANOL		<0.01						
ETHYL METHACRYLATE		<0.01	<0.01	<0.01	<0.001	<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE		<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
M-XYLENE	<0.001							
O-XYLENE	<0.001							<0.001
P-XYLENE	<0.001							
METHYL ETHYL KETONE								<0.02
METHYL ISOBUTYL KETONE								<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.0011	0.0013	0.0016	0.0015	0.004	0.0016	0.0014	0.0014
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE		<0.01	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	59	59	59	59	59	59	59
SAMPLE DATE	06/01/90	04/04/91	01/22/92	05/20/92	12/01/92	05/26/93	01/04/94
SAMPLE TIME	14:50	14:00	11:40	10:20	13:15		14:00
LAB	EL	EL	EL	EL	EL	EL	EL
LAB NUMBER	90-14927	91-12766	92-4688	92-19277	92-50583	93-21824	94-3394
SAMPLE NUMBER	HL-0690-202	HL-9104-103	HL-9201-105	HL-9205-102	HL-9212-902	HL-5	HL-104S3
-- VOLATILE ORGANICS --							
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001
-- SEMI-VOLATILE EXTRACTABLES --							
1,2,3-TRICHLORO BENZENE	<0.001						
1,2,3-TRICHLORO PROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4-TRICHLORO BENZENE	<0.001						
1,2,4-TRIMETHYL BENZENE	<0.001						
1,2-DIBROMO-3-CHLORO PROPANE	<0.001						<0.001
1,2-DICHLORO BENZENE	<0.001						<0.001
1,3,5-TRIMETHYL BENZENE	<0.001						
1,3-DICHLORO BENZENE	<0.001						
1,3-DICHLORO PROPANE	<0.001						
1,4-DICHLORO-2-BUTENE		<0.01					<0.002
1,4-DICHLORO BENZENE	<0.0005						<0.001
1,4-DIFLUORO BENZENE		<0.01	<0.01	<0.01	<0.001	<0.001	
DICHLOROMONOFUOROMETHANE	<0.001						
HEXACHLOROBUTADIENE	<0.001						
ISOPROPYLBENZENE	<0.001						
N-BUTYLBENZENE	<0.001						
N-PROPYLBENZENE	<0.001						
NAPHTHALENE	<0.001						
P-ISOPROPYLTOLUENE	<0.001						
SEC-BUTYLBENZENE	<0.001						
TERT-BUTYLBENZENE	<0.001						

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	59
SAMPLE DATE	04/18/94
LAB	EL
LAB NUMBER	94-16465
SAMPLE NUMBER	HL-4

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.001
1,2-DICHLOROPROPANE	<0.001
2-HEXANONE	<0.02
ACETONE	<0.05
ACRYLONITRILE	<0.02
BENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON DISULFIDE	<0.001
CARBON TETRACHLORIDE	<0.001
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0015
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	0.0013
DICHLOROFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
IODOMETHANE	<0.001
O-XYLENE	<0.001
METHYL ETHYL KETONE	<0.02
METHYL ISOBUTYL KETONE	<0.02
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	0.0011
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.001
TRICHLOROFLUOROMETHANE	<0.001
VINYL ACETATE	<0.001
VINYL CHLORIDE	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002
1,4-DICHLORO-2-BUTENE	<0.002
1,4-DICHLOROBENZENE	<0.001

-- HYDROCARBONS --

M+P-XYLENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE 62
 SAMPLE DATE 12/08/94
 SAMPLE TIME 08:30
 LAB EL
 LAB NUMBER 94-60434
 SAMPLE NUMBER HL-9412-105

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.001
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.001
 1,2-DICHLOROPROPANE <0.001
 2-HEXANONE <0.02
 ACETONE <0.05
 ACRYLONITRILE <0.02
 BENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON DISULFIDE <0.001
 CARBON TETRACHLORIDE <0.001
 CHLOROETHANE <0.001
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM 0.0071
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE 0.0022
 ETHYLBENZENE <0.001
 IODOMETHANE <0.001
 O-XYLENE <0.001
 METHYL ETHYL KETONE <0.02
 METHYL ISOBUTYL KETONE <0.02
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE 0.0027
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.001
 TRICHLOROFLUOROMETHANE <0.001
 VINYL ACETATE <0.001
 VINYL CHLORIDE <0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.005
 1,2-DICHLOROBENZENE <0.001
 TRANS-1,4-DICHLORO-2-BUTENE <0.002
 1,4-DICHLOROBENZENE <0.001

-- HYDROCARBONS --

M+P-XYLENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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Sample Type: Private Well

SITE CODE	67	67
SAMPLE DATE	06/01/90	06/01/90
SAMPLE TIME	16:05	16:00
LAB	EL	EL
LAB NUMBER	90-14928	90-14929
REMARKS	DEEP	SHALLOW
SAMPLE NUMBER	HL-0690-203	HL-0690-204

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005
1,1-DICHLOROPROPENE	<0.001	<0.001
1,2-DIBROMOETHANE	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005
1,2-DICHLOROPROPANE	<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001	<0.001
2-CHLOROTOLUENE	<0.001	<0.001
4-CHLOROTOLUENE	<0.001	<0.001
BENZENE	<0.0005	<0.0005
BROMOBENZENE	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001
BROMOFORM	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005
CHLOROBENZENE	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001
CHLOROFORM	<0.001	0.0011
CHLOROMETHANE	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001
ETHYLBENZENE	<0.001	<0.001
M-XYLENE	<0.001	<0.001
O-XYLENE	<0.001	<0.001
P-XYLENE	<0.001	<0.001
METHYLENE CHLORIDE	<0.001	<0.001
STYRENE	<0.001	<0.001
TETRACHLOROETHENE	<0.0005	0.00064
TOLUENE	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005
TRICHLOROFLUOROMETHANE	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	<0.001
1,2,3-TRICHLOROPROPANE	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.001
1,2,4-TRIMETHYLBENZENE	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001
1,2-DICHLOROBENZENE	<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001	<0.001
1,3-DICHLOROBENZENE	<0.001	<0.001
1,3-DICHLOROPROPANE	<0.001	<0.001
1,4-DICHLOROBENZENE	<0.0005	<0.0005
DICHLOROMONOFUOROMETHANE	<0.001	<0.001
HEXACHLOROBUTADIENE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	67	67
SAMPLE DATE	06/01/90	06/01/90
SAMPLE TIME	16:05	16:00
LAB	EL	EL
LAB NUMBER	90-14928	90-14929
REMARKS	DEEP	SHALLOW
SAMPLE NUMBER	HL-0690-203	HL-0690-204

-- SEMI-VOLATILE EXTRACTABLES --

ISOPROPYLBENZENE	<0.001	<0.001
N-BUTYLBENZENE	<0.001	<0.001
N-PROPYLBENZENE	<0.001	<0.001
NAPHTHALENE	<0.001	<0.001
P-ISOPROPYLTOLUENE	<0.001	<0.001
SEC-BUTYLBENZENE	<0.001	<0.001
TERT-BUTYLBENZENE	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE 68
 SAMPLE DATE 04/04/91
 SAMPLE TIME 12:00
 LAB EL
 LAB NUMBER 91-12764
 SAMPLE NUMBER HL-9104-101

-- VOLATILE ORGANICS --

1,1,1-TRICHLOROETHANE <0.0005
 1,1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.0005
 1,2-DICHLOROETHANE <0.0005
 2-BUTANONE (METHYL-ETHYL-KETONE) <0.01
 2-CHLOROETHYL VINYL ETHER <0.01
 2-HEXANONE <0.01
 4-BROMOFLUOROBENZENE <0.01
 4-METHYL-2-PENTANONE <0.01
 ACETONE <0.01
 ACROLEIN <0.01
 ACRYLONITRILE <0.01
 BENZENE <0.0005
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON DISULFIDE <0.01
 CARBON TETRACHLORIDE <0.0005
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHANOL <0.01
 ETHYL METHACRYLATE <0.01
 ETHYLBENZENE <0.001
 IODOMETHANE <0.01
 TOTAL XYLENE <0.001
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.0005
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.0005
 TRICHLOROFLUOROMETHANE <0.001
 VINYL ACETATE <0.01
 VINYL CHLORIDE <0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE <0.001
 1,4-DICHLORO-2-BUTENE <0.01
 1,4-DIFLUOROBENZENE <0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	75	75	75	75	75	75	75
SAMPLE DATE	01/22/92	05/20/92	12/01/92	05/26/93	01/04/94	04/18/94	12/08/94
SAMPLE TIME	13:30	10:45	14:05		14:40		09:00
LAB	EL	EL	EL	EL	EL	EL	HYIRO
LAB NUMBER	92-4690	92-19278	92-50585	93-21826	94-3396	94-16466	
REMARKS							NO SAMPLE
SAMPLE NUMBER	HL-9201-107	HL-9205-100	HL-9212-904	HL-7	HL-104C4	HL-5	HL-9412-106

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE					<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE					<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE					<0.001	<0.001
2-CHLOROETHYL VINYL ETHER	<0.01	<0.01	<0.001	<0.001		
2-HEXANONE					<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01	<0.01	<0.01		
ACETONE					<0.02	<0.05
ACRYLONITRILE					<0.02	<0.02
BENZENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE					<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE					<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLOROFLUOROMETHANE						<0.001
ETHYL METHACRYLATE	<0.01	<0.01	<0.001	<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001	<0.001	<0.001	<0.001	
O-XYLENE					<0.001	<0.001
METHYL ETHYL KETONE					<0.02	<0.02
METHYL ISOBUTYL KETONE					<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.01	<0.01	<0.02	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE					<0.001	<0.001
1,2-DICHLOROBENZENE					<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE						<0.002
1,4-DICHLORO-2-BUTENE					<0.002	<0.002
1,4-DICHLOROBENZENE					<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	75	75	75	75	75	75	75
SAMPLE DATE	01/22/92	05/20/92	12/01/92	05/26/93	01/04/94	04/18/94	12/08/94
SAMPLE TIME	13:30	10:45	14:05		14:40		09:00
LAB	EL	EL	EL	EL	EL	EL	HYDRO
LAB NUMBER	92-4690	92-19278	92-50585	93-21826	94-33396	94-16466	
REMARKS							NO SAMPLE
SAMPLE NUMBER	HL-9201-107	HL-9205-100	HL-9212-904	HL-7	HL-104C4	HL-5	HL-9412-106
-- SEMI-VOLATILE EXTRACTABLES --							
1,4-DIFLUOROBENZENE	<0.01	<0.01	<0.001	<0.001			
-- HYDROCARBONS --							
M+P-XYLENE						<0.001	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Summary of the work done during the year

Item	1954	1953	1952	1951	1950	1949	1948
1. General	100	100	100	100	100	100	100
2. Research	100	100	100	100	100	100	100
3. Development	100	100	100	100	100	100	100
4. Production	100	100	100	100	100	100	100
5. Marketing	100	100	100	100	100	100	100
6. Administration	100	100	100	100	100	100	100
7. Finance	100	100	100	100	100	100	100
8. Personnel	100	100	100	100	100	100	100
9. Legal	100	100	100	100	100	100	100
10. Other	100	100	100	100	100	100	100

Sample Type: Private Well

	84	84	84	84	84
SITE CODE	84	84	84	84	84
SAMPLE DATE	06/06/90	04/18/94	08/25/94	09/27/94	12/08/94
SAMPLE TIME	12:45		09:45		09:30
LAB	EL	EL	HYDRO	EL	EL
LAB NUMBER	90-15044	94-16469		94-47472	94-60436
REMARKS			NO SAMPLE		
OTHER INFO			NO DEPTH TAKE		
SAMPLE NUMBER	HL-9006-106	HL-8	HL-9408-109	HL-9409-100	HL-9412-109

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001		<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.0005	<0.001		<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001		<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001		<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001		<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001		<0.001	<0.001
1,1-DICHLOROPROPENE	<0.001				
1,2-DIBROMOETHANE	<0.001	<0.001		<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001		<0.001	<0.001
1,2-DICHLOROPROPANE	<0.001	<0.001		<0.001	<0.001
2,2-DICHLOROPROPANE	<0.001				
2-CHLOROTOLUENE	<0.001				
2-HEXANONE		<0.02		<0.02	<0.02
4-CHLOROTOLUENE	<0.001				
ACETONE		<0.05		<0.05	<0.05
ACRYLONITRILE		<0.02		<0.02	<0.02
BENZENE	<0.0005	<0.001		<0.001	<0.001
BROMOBENZENE	<0.001				
BROMOCHLOROMETHANE	<0.001	<0.001		<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001		<0.001	<0.001
BROMOFORM	<0.001	<0.001		<0.001	<0.001
BROMOMETHANE	<0.001	<0.001		<0.001	<0.001
CARBON DISULFIDE		<0.001		<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001		<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001		<0.001	<0.001
CHLOROETHANE	<0.001	<0.001		<0.001	<0.001
CHLOROFORM	<0.001	<0.001		<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001		<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001		<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001		<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001		<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001		<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001		<0.001	<0.001
DICHLOROFLUOROMETHANE		<0.001			
ETHYLBENZENE	<0.001	<0.001		<0.001	<0.001
IODOMETHANE		<0.001		<0.001	<0.001
M-XYLENE	<0.001				
O-XYLENE	<0.001	<0.001		<0.001	<0.001
P-XYLENE	<0.001				
METHYL ETHYL KETONE				<0.02	
METHYL ETHYL KETONE		<0.02			<0.02
METHYL ISOBUTYL KETONE		<0.02		<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001		<0.001	<0.001
STYRENE	<0.001	<0.001		<0.001	<0.001
TETRACHLOROETHENE	<0.0005	<0.001		<0.001	<0.001
TOLUENE	<0.001	<0.001		<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001		<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001		<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.001		<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001		<0.001	<0.001
VINYL ACETATE		<0.001		<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001		<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

	84	84	84	84	84
SITE CODE	84	84	84	84	84
SAMPLE DATE	06/06/90	04/18/94	08/25/94	09/27/94	12/08/94
SAMPLE TIME	12:45		09:45		09:30
LAB	EL	EL	HYDRO	EL	EL
LAB NUMBER	90-15044	94-16469		94-47472	94-60436
REMARKS			NO SAMPLE		
OTHER INFO			NO DEPTH TAKE		
SAMPLE NUMBER	HL-9006-106	HL-8	HL-9408-109	HL-9409-100	HL-9412-109
-- SEMI-VOLATILE EXTRACTABLES --					
1,2,3-TRICHLOROPROPANE	<0.001	<0.001		<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001				
1,2,4-TRIMETHYLBENZENE	<0.001				
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001		<0.005	<0.005
1,2-DICHLOROBENZENE	<0.001	<0.001		<0.001	<0.001
1,3,5-TRIMETHYLBENZENE	<0.001				
1,3-DICHLOROBENZENE	<0.001				
1,3-DICHLOROPROPANE	<0.001				
TRANS-1,4-DICHLORO-2-BUTENE		<0.002		<0.002	<0.002
1,4-DICHLORO-2-BUTENE		<0.002			
1,4-DICHLOROBENZENE	<0.0005	<0.001		<0.001	<0.001
DICHLOROMONOFUOROMETHANE	<0.001				
HEXACHLOROBUTADIENE	<0.001				
ISOPROPYLBENZENE	<0.001				
N-BUTYLBENZENE	<0.001				
N-PROPYLBENZENE	<0.001				
NAPHTHALENE	<0.001				
P-ISOPROPYLTOLUENE	<0.001				
SEC-BUTYLBENZENE	<0.001				
TERT-BUTYLBENZENE	<0.001				
-- HYDROCARBONS --					
M+P-XYLENE		<0.001		<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	87
SAMPLE DATE	05/28/93
LAB	EL
LAB NUMBER	93-21828
SAMPLE NUMBER	HL-9

-- VOLATILE ORGANICS --

1,1,1-TRICHLOROETHANE	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.001
1,2-DICHLOROETHANE	<0.001
2-CHLOROETHYL VINYL ETHER	<0.001
4-BROMOFLUOROBENZENE	<0.01
BENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON TETRACHLORIDE	<0.001
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0011
CHLOROMETHANE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYL METHACRYLATE	<0.001
ETHYLBENZENE	<0.001
IODOMETHANE	<0.001
TOTAL XYLENE	<0.001
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.001
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.001
TRICHLOROFLUOROMETHANE	<0.001
VINYL ACETATE	<0.001
VINYL CHLORIDE	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001
1,4-DIFLUOROBENZENE	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

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2099	2100

Sample Type: Private Well

SITE CODE	92
SAMPLE DATE	12/08/94
LAB	HYDRO
LAB NUMBER	
REMARKS	NO SAMPLE
SAMPLE NUMBER	HL-9412-107

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE	93
SAMPLE DATE	12/20/94
SAMPLE TIME	09:30
LAB	EL
LAB NUMBER	94-61429
SAMPLE NUMBER	HL-9412-110

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001
1,1,1-TRICHLOROETHANE	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001
1,1,2-TRICHLOROETHANE	<0.001
1,1-DICHLOROETHANE	<0.001
1,1-DICHLOROETHENE	<0.001
1,2-DIBROMOETHANE	<0.001
1,2-DICHLOROETHANE	<0.001
1,2-DICHLOROPROPANE	<0.001
2-HEXANONE	<0.02
ACETONE	<0.05
ACRYLONITRILE	<0.02
BENZENE	<0.001
BROMOCHLOROMETHANE	<0.001
BROMODICHLOROMETHANE	<0.001
BROMOFORM	<0.001
BROMOMETHANE	<0.001
CARBON DISULFIDE	<0.001
CARBON TETRACHLORIDE	<0.001
CHLOROBENZENE	<0.001
CHLOROETHANE	<0.001
CHLOROFORM	0.0018
CHLOROMETHANE	<0.001
CIS-1,2-DICHLOROETHENE	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001
DIBROMOCHLOROMETHANE	<0.001
DIBROMOMETHANE	<0.001
DICHLORODIFLUOROMETHANE	<0.001
ETHYLBENZENE	<0.001
IODOMETHANE	<0.001
O-XYLENE	<0.001
METHYL ETHYL KETONE	<0.02
METHYL ISOBUTYL KETONE	<0.02
METHYLENE CHLORIDE	<0.001
STYRENE	<0.001
TETRACHLOROETHENE	<0.001
TOLUENE	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001
TRICHLOROETHENE	<0.001
TRICHLOROFUOROMETHANE	<0.001
VINYL ACETATE	<0.001
VINYL CHLORIDE	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001
1,2-DIBROMO-3-CHLOROPROPANE	<0.001
1,2-DICHLOROBENZENE	<0.001
TRANS-1,4-DICHLORO-2-BUTENE	<0.002
1,4-DICHLOROBENZENE	<0.001

-- HYDROCARBONS --

M+P-XYLENE	<0.001
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NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Private Well

SITE CODE 96
 SAMPLE DATE 12/08/94
 SAMPLE TIME 14:00
 LAB EL
 LAB NUMBER 94-60435
 SAMPLE NUMBER HL-9412-108

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE <0.001
 1,1,1-TRICHLOROETHANE <0.001
 1,1,2,2-TETRACHLOROETHANE <0.001
 1,1,2-TRICHLOROETHANE <0.001
 1,1-DICHLOROETHANE <0.001
 1,1-DICHLOROETHENE <0.001
 1,2-DIBROMOETHANE <0.001
 1,2-DICHLOROETHANE <0.001
 1,2-DICHLOROPROPANE <0.001
 2-HEXANONE <0.02
 ACETONE <0.05
 ACRYLONITRILE <0.02
 BENZENE <0.001
 BROMOCHLOROMETHANE <0.001
 BROMODICHLOROMETHANE <0.001
 BROMOFORM <0.001
 BROMOMETHANE <0.001
 CARBON DISULFIDE <0.001
 CARBON TETRACHLORIDE <0.001
 CHLOROBENZENE <0.001
 CHLOROETHANE <0.001
 CHLOROFORM <0.001
 CHLOROMETHANE <0.001
 CIS-1,2-DICHLOROETHENE <0.001
 CIS-1,3-DICHLOROPROPENE <0.001
 DIBROMOCHLOROMETHANE <0.001
 DIBROMOMETHANE <0.001
 DICHLORODIFLUOROMETHANE <0.001
 ETHYLBENZENE <0.001
 IODOMETHANE <0.001
 O-XYLENE <0.001
 METHYL ETHYL KETONE <0.02
 METHYL ISOBUTYL KETONE <0.02
 METHYLENE CHLORIDE <0.001
 STYRENE <0.001
 TETRACHLOROETHENE <0.001
 TOLUENE <0.001
 TRANS-1,2-DICHLOROETHENE <0.001
 TRANS-1,3-DICHLOROPROPENE <0.001
 TRICHLOROETHENE <0.001
 TRICHLOROFLUOROMETHANE <0.001
 VINYL ACETATE <0.001
 VINYL CHLORIDE <0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE <0.001
 1,2-DIBROMO-3-CHLOROPROPANE <0.005
 1,2-DICHLOROBENZENE <0.001
 TRANS-1,4-DICHLORO-2-BUTENE <0.002
 1,4-DICHLOROBENZENE <0.001

-- HYDROCARBONS --

M+P-XYLENE <0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	BLANK	BLANK	BLANK
SAMPLE DATE	11/11/89	05/07/90	01/22/92
SAMPLE TIME	19:00	09:15	08:30
LAB	EL	EL	EL
LAB NUMBER	89-20184	90-10832	92-4685
SAMPLE NUMBER	HL-8911-005	HL-9005-115	HL-9201-102

-- PHYSICAL PARAMETERS --

PH	5.4
SC (UMHOS/CM AT 25 C)	2.0
TDS (MEASURED AT 180 C)	<1.0
TOTAL SUSPENDED SOLIDS	<1.0

-- MAJOR CONSTITUENTS --

CALCIUM (CA) DIS	<1.0
MAGNESIUM (MG) DIS	<1.0
SODIUM (NA) DIS	<1.0
POTASSIUM (K) DIS	<1.0
TOTAL ALKALINITY AS CaCO3	2.0
BICARBONATE (HCO3)	2.0
CARBONATE AS CO3	0.0
SULFATE (SO4)	<1.0
CHLORIDE (CL)	<1.0

-- NUTRIENTS --

AMMONIA (NH3 AS N)	<0.1
NITRATE + NITRITE AS N	<0.05

-- METALS & MINOR CONSTITUENTS --

ARSENIC (AS) DIS	<0.005
BARIUM (BA) DIS	<0.1
CADMIUM (CD) DIS	<0.001
CHROMIUM (CR) DIS	<0.02
IRON (FE) DIS	<0.03
LEAD (PB) DIS	<0.01
MANGANESE (MN) DIS	<0.02
MERCURY (HG) DIS	<0.001
SELENIUM (SE) DIS	<0.005
SILVER (AG) DIS	<0.005

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE	<0.001	<0.001	
1,1,1-TRICHLOROETHANE	<0.0005	<0.0005	0.00057
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.0005	<0.0005
1,1-DICHLOROPROPENE	<0.001	<0.001	
1,2-DIBROMOETHANE	<0.001	<0.001	
1,2-DICHLOROETHANE	<0.0005	<0.0005	<0.0005
1,2-DICHLOROPROPANE	<0.001	<0.001	
2,2-DICHLOROPROPANE	<0.001	<0.001	
2-CHLOROETHYL VINYL ETHER			<0.01
2-CHLOROTOLUENE	<0.001	<0.001	
4-BROMOFLUOROBENZENE			<0.01
4-CHLOROTOLUENE	<0.001	<0.001	
BENZENE	0.00073	<0.0005	<0.0005
BROMOBENZENE	<0.001	<0.001	
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.0005	<0.0005
CHLOROBENZENE	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	BLANK	BLANK	BLANK
SAMPLE DATE	11/11/89	05/07/90	01/22/92
SAMPLE TIME	19:00	09:15	08:30
LAB	EL	EL	EL
LAB NUMBER	89-20184	90-10832	92-4685
SAMPLE NUMBER	HL-8911-005	HL-9005-115	HL-9201-102

-- VOLATILE ORGANICS --

CHLOROFORM	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE	<0.001	<0.001	
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001
ETHYL METHACRYLATE			<0.01
ETHYLBENZENE	<0.001	<0.001	<0.001
IODOMETHANE			<0.01
TOTAL XYLENE			<0.001
M-XYLENE	<0.001	<0.001	
O-XYLENE	<0.001	<0.001	
P-XYLENE	<0.001	<0.001	
METHYLENE CHLORIDE	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.0005	<0.0005	<0.0005
TOLUENE	0.001	<0.001	0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.0005	<0.0005
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001
VINYL ACETATE			<0.01
VINYL CHLORIDE	<0.0005	<0.0005	<0.0005

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROBENZENE	<0.001	<0.001	
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001
1,2,4-TRICHLOROBENZENE	<0.001	<0.001	
1,2,4-TRIMETHYLBENZENE	<0.001	<0.001	
1,2-DIBROMO-3-CHLOROPROPANE	<0.001	<0.001	
1,2-DICHLOROBENZENE	<0.001	<0.001	
1,3,5-TRIMETHYLBENZENE	<0.001	<0.001	
1,3-DICHLOROBENZENE	<0.001	<0.001	
1,3-DICHLOROPROPANE	<0.001	<0.001	
1,4-DICHLOROBENZENE	<0.0005	<0.0005	
1,4-DIFLUOROBENZENE			<0.01
DICHLOROMONOFUOROMETHANE		<0.001	
HEXACHLOROBUTADIENE	<0.001	<0.001	
ISOPROPYLBENZENE	<0.001	<0.001	
N-BUTYLBENZENE	<0.001	<0.001	
N-PROPYLBENZENE	<0.001	<0.001	
NAPHTHALENE	<0.001	<0.001	
P-ISOPROPYLTOLUENE	<0.001	<0.001	
SEC-BUTYLBENZENE	<0.001	<0.001	
TERT-BUTYLBENZENE	<0.001	<0.001	

-- OTHER PARAMETERS --

CYANIDE (CN) TOT	<0.005
CHEMICAL OXYGEN DEMAND	<1.0

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 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45
LAB	EL	EL	EL	EL	EL
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115

-- PHYSICAL PARAMETERS --

PH	5.4	4.3		5.8
SC (UMHOS/CM AT 25 C)	2.0	2.0		1.0
TDS (MEASURED AT 180 C)	5.0			
TOTAL SUSPENDED SOLIDS	12.0			

-- MAJOR CONSTITUENTS --

CALCIUM (CA) DIS	<1.0			
MAGNESIUM (MG) DIS	<1.0			
SODIUM (NA) DIS	<1.0			
POTASSIUM (K) DIS	<1.0			
TOTAL ALKALINITY AS CaCO3	2.0			
BICARBONATE (HCO3)	2.0			
CARBONATE AS CO3	0.0			
SULFATE (SO4)	<1.0	<1.0		<1.0
CHLORIDE (CL)	<1.0	<1.0		<1.0

-- NUTRIENTS --

AMMONIA (NH3 AS N)	<0.1			
NITRATE (NO3-N)	<0.05	<0.05		
NITRATE + NITRITE AS N				<0.05

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS		<0.05	<0.05	<0.05
ARSENIC (AS) DIS	<0.005	<0.005	<0.005	<0.005
BARIUM (BA) DIS	<0.1	<0.1	<0.1	<0.1
BERYLLIUM (BE) DIS		<0.001	<0.001	<0.001
CADMIUM (CD) DIS	<0.001	<0.001	<0.001	<0.001
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01
COBALT (CO) DIS		<0.01	<0.01	<0.01
COPPER (CU) DIS		<0.01	<0.01	<0.01
IRON (FE) DIS	<0.03	<0.03		<0.03
LEAD (PB) DIS	<0.01	<0.01	<0.01	<0.01
MANGANESE (MN) DIS	<0.01			
MERCURY (HG) DIS	<0.001	<0.001	<0.001	<0.001
NICKEL (NI) DIS		<0.01	<0.01	<0.01
SELENIUM (SE) DIS	<0.005	<0.005	<0.005	<0.005
SILVER (AG) DIS	<0.005	<0.005	<0.005	<0.005
THALLIUM (TL) DIS		<0.1	<0.1	<0.1
TIN (SN) DIS			<0.1	
VANADIUM (V) DIS		<0.1	<0.1	<0.1
ZINC (ZN) DIS		<0.01	0.02	<0.01

-- VOLATILE ORGANICS --

ACETONITRILE METHYLCYANIDE			<0.02	
ALLYLCHLORIDE 3-CHLORO-1-PROPENE			<0.001	
1,1,1,2-TETRACHLOROETHANE		<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROPROPENE			<0.001	
1,2-DICHLOROETHANE		<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE		<0.001	<0.001	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45
LAB	EL	EL	EL	EL	EL
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115

-- VOLATILE ORGANICS --

2,2-DICHLOROPROPANE			<0.001		
2-CHLOROETHYL VINYL ETHER	<0.001				
2-HEXANONE		<0.02	<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01				
ACETONE		<0.02	<0.05	<0.05	<0.05
ACROLEIN			<0.02		
ACRYLONITRILE		<0.02	<0.02	<0.02	<0.02
BENZENE	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE		<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROPRENE 2-CHLORO-1,3-BUTADIENE			<0.001		
CIS-1,2-DICHLOROETHENE		<0.001	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
ETHYL METHACRYLATE	<0.001		<0.001		
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
ISOBUTANOL			<0.05		
TOTAL XYLENE	<0.001				
M-P XYLENE		<0.001			
O-XYLENE		<0.001	<0.001	<0.001	<0.001
METHACRYLONITRILE			<0.02		
METHYL ETHYL KETONE			<0.02	<0.02	
METHYL ETHYL KETONE		<0.02			<0.02
METHYL ISOBUTYL KETONE		<0.02	<0.02	<0.02	<0.02
METHYL METHACRYLATE			<0.002		
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001
PROPIONITRILE ETHYLCYANIDE			<0.02		
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001
TOLUENE	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001
PICLORAM			<0.0005		

-- SEMI-VOLATILE EXTRACTABLES --

ALPHA-CHLORDANE			<0.00005		
1,4-BENZENEDIAMINE			ND		
CHLOROBENZILATE			<0.01		
1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001
1,2,4,5-TETRACHLOROBENZENE			<0.01		
1,2,4-TRICHLOROBENZENE			<0.001		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FID) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45
LAB	EL	EL	EL	EL	EL
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115

-- SEMI-VOLATILE EXTRACTABLES --

1,2-DIBROMO-3-CHLOROPROPANE		<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE		<0.001	<0.001	<0.001	<0.001
1,3,5-TRINITROBENZENE			<0.01		
1,3-DICHLOROBENZENE			<0.001		
1,3-DICHLOROPROPANE			<0.001		
1,3-DINITROBENZENE			<0.01		
TRANS-1,4-DICHLORO-2-BUTENE		<0.002		<0.002	<0.002
1,4-DICHLORO-2-BUTENE			<0.002		
1,4-DICHLOROBENZENE		<0.001	<0.001	<0.001	<0.001
1,4-DIFLUOROBENZENE	<0.001				
METHAPYRILENE			ND		
1-METHYLNAPHTHALENE			<0.01		
1-NAPHTHYLAMINE			<0.01		
2,3,4,6-TETRACHLOROPHENOL			<0.01		
2,4,5-TRICHLOROPHENOL			<0.01		
2,4,6-TRICHLOROPHENOL			<0.01		
2,4-DICHLOROPHENOL			<0.01		
2,4-DIMETHYLPHENOL			<0.01		
2,4-DINITROPHENOL			<0.05		
2,4-DINITROTOLUENE			<0.01		
2,6-DICHLOROPHENOL			<0.01		
2,6-DINITROTOLUENE			<0.01		
2-CHLORONAPHTHALENE			<0.01		
2-CHLOROPHENOL			<0.01		
2-METHYLNAPHTHALENE			<0.01		
2-METHYLPHENOL (O-CRESOL)			<0.01		
2-NAPHTHYLAMINE			<0.01		
2-NITROANILINE			<0.01		
2-NITROPHENOL			<0.01		
2-PICOLINE			<0.01		
3,3-DICHLOROBENZIDINE			<0.02		
3-METHYLCHOLANTHRENE			<0.1		
3-NITROANILINE			<0.01		
4,6-DINITRO-2-METHYLPHENOL			<0.05		
4-AMINOBIIPHENYL			<0.01		
4-BROMOPHENYL PHENYL ETHER			<0.01		
4-CHLORO-3-METHYLPHENOL			<0.01		
4-CHLORO-2-METHYLPHENOL			<0.01		
4-CHLOROPHENOL			<0.01		
4-CHLOROPHENYL PHENYL ETHER			<0.01		
4-METHYLPHENOL/3-METHYLPHENOL			<0.01		
4-NITROANILINE			<0.01		
4-NITROPHENOL			<0.0005		
7,12-DIMETHYLBENZENE (A) ANTHRACENE			<0.01		
A,A-DIMETHYLPHENETHYLAMINE			ND		
ACENAPHTHENE			<0.01		
ACENAPHTHYLENE			<0.01		
ACETOPHENONE			<0.01		
ANILINE			<0.01		
ANTHRACENE			<0.01		
ARAMITE			<0.01		
1,2-DIPHENYLHYDRAZINE (AZOBENZENE)			<0.01		
BENZIDINE			<0.02		
BENZO (A) ANTHRACENE			<0.01		
BENZO (A) PYRENE			<0.01		
BENZO (B) FLUORANTHENE			<0.01		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

	SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94	
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45	
LAB	EL	EL	EL	EL	EL	
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164	
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK	
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115	

-- SEMI-VOLATILE EXTRACTABLES --

BENZO (GHI) PERYLENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZYL ALCOHOL	<0.01
BIS (2-CHLOROETHOXY) METHANE	<0.01
BIS (2-CHLOROETHYL) ETHER	<0.01
BIS (2-CHLOROISOPROPYL) ETHER	<0.01
BIS (2-ETHYLHEXYL) PHTHALATE	<0.01
BUTYL BENZYL PHTHALATE	<0.01
CHRYSENE	<0.01
DI-N-BUTYLPHTHALATE	<0.01
DI-N-OCTYLPHTHALATE	<0.01
DIBENZO (A,H) ANTHRACENE	<0.01
DIBENZOFURAN	<0.01
DIETHYLPHTHALATE	<0.01
3,3'-DIMETHYLBENZIDINE	<0.01
DIMETHYLPHTHALATE	<0.01
DINOSEB	<0.001
DIPHENYLAMINE	<0.01
ETHYL METHANESULFONATE	<0.01
FAMPHUR	<0.01
FLUORANTHENE	<0.01
FLUORENE	<0.01
2-ACETYL AMINO FLUORENE	<0.01
HEXACHLOROBENZENE	<0.01
HEXACHLOROBUTADIENE	<0.001
HEXACHLOROCYCLOPENTADIENE	<0.01
HEXACHLOROETHANE	<0.01
HEXACHLOROPHENE	ND
HEXACHLOROPHROPENE	<0.01
INDENO (1,2,3-CD) PYRENE	<0.01
ISODRIN	<0.0001
ISOPHORONE	<0.01
KEPONE	<0.001
ISOSAFROLE	<0.01
METHYL METHANESULFONATE	<0.01
5-NITRO-O-TOLUIDINE	<0.01
N-NITROSO-DI-N-BUTYLAMINE	<0.01
N-NITROSO-DI-N-PROPYLAMINE	<0.01
N-NITROSODIMETHYLAMINE	<0.01
N-NITROSODIPHENYLAMINE	<0.01
N-NITROSOPIPERIDINE	<0.01
N-NITROSODIETHYLAMINE	<0.01
N-NITROSOPYRROLIDINE	<0.01
O-TOLUIDINE	<0.01
N-NITROSOMORPHOLINE	<0.01
N-NITROSOMETHYLETHYLAMINE	<0.01
NAPHTHALENE	<0.001
NITROBENZENE	<0.01
4-NITROQUINOLINE-N-OXIDE	<0.1
P-CHLOROTOLUENE	<0.01
P-CHLOROANILINE	<0.01
P-DIMETHYLAMINOAZOBENZENE	<0.01
1,4-NAPHTHOQUINONE	<0.1
PARATHION	<0.01
PENTACHLOROBENZENE	<0.01
PENTACHLORONITROBENZENE	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

Sample Type: Quality Control

SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45
LAB	EL	EL	EL	EL	EL
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115

-- SEMI-VOLATILE EXTRACTABLES --

PENTACHLOROPHENOL	<0.00005		
PHENACETIN	<0.01		
PHENANTHRENE	<0.01		
PHENOL	<0.01		
O,O,O-TRIETHYLPHOSPHOROTHIOATE	<0.01		
PYRENE	<0.01		
PYRIDINE	<0.02		
SAFROLE	<0.01		
THIONAZIN	<0.01		

-- HYDROCARBONS --

M+P-XYLENE	<0.001		
M+P-XYLENE		<0.001	<0.001
ACIFLOURFEN	<0.0005		
BENTAZON	<0.0025		
CHLORAMBEN	<0.0005		
DACTHAL	<0.001		
DALAPON	<0.01		
DICAMBA	<0.00025		
DICHLORPROP	<0.001		
AROCLOR 1016	<0.001		
AROCLOR 1221	<0.002		
AROCLOR 1232	<0.001		
AROCLOR 1242	<0.001		
AROCLOR 1248	<0.001		
AROCLOR 1254	<0.001		
AROCLOR 1260	<0.001		
AROCLOR 1262	<0.001		
AROCLOR 1268	<0.001		
2,4-D	<0.001		
2,4-DB	<0.0025		
DIALATE (AVADEX)	<0.01		
3,5-DICHLOROBEZOIC ACID	<0.0005		
DIMETHOATE (CYGON)	<0.1		
DISULFOTON	<0.01		
MCPA	<0.2		
MCPP	<0.2		
METHYL PARATHION (PENNCAP-M)	<0.01		
PHORATE (THIMET)	<0.01		
SULFOTEP	<0.01		
2,4,5-T	<0.0002		
2,4,5-TP (SILVEX)	<0.0002		

-- OTHER PARAMETERS --

4;4'-DDD	<0.0001		
4;4'-DDE	<0.0001		
4;4'-DDT	<0.0001		
ALDRIN	<0.00005		
ALPHA-BHC	<0.00005		
BETA-BHC	<0.00005		
GAMMA-CHLORDANE	<0.00005		
CYANIDE (CN) TOT	<0.005	<0.005	<0.005
DELTA-BHC	<0.00005		
DIELDRIN	<0.0001		
ENDOSULFAN I	<0.00005		
ENDOSULFAN II	<0.0001		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

TABLE 1. SUMMARY OF DATA FOR THE STUDY

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-15	08:00	15.2	12	090	75	3
2	1998-01-15	12:00	18.5	15	090	70	3
3	1998-01-15	16:00	20.1	18	090	65	3
4	1998-01-15	20:00	18.8	15	090	60	3
5	1998-01-15	24:00	16.5	12	090	55	3

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-16	00:00	14.8	10	090	50	3
2	1998-01-16	04:00	13.5	8	090	45	3
3	1998-01-16	08:00	12.2	6	090	40	3
4	1998-01-16	12:00	11.0	5	090	35	3
5	1998-01-16	16:00	10.5	4	090	30	3

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-16	20:00	9.8	3	090	25	3
2	1998-01-16	24:00	9.2	2	090	20	3
3	1998-01-17	00:00	8.5	1	090	15	3
4	1998-01-17	04:00	7.8	1	090	10	3
5	1998-01-17	08:00	7.2	1	090	5	3

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-17	12:00	6.5	1	090	0	3
2	1998-01-17	16:00	5.8	1	090	0	3
3	1998-01-17	20:00	5.2	1	090	0	3
4	1998-01-17	24:00	4.5	1	090	0	3
5	1998-01-18	00:00	3.8	1	090	0	3

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-18	04:00	3.2	1	090	0	3
2	1998-01-18	08:00	2.5	1	090	0	3
3	1998-01-18	12:00	1.8	1	090	0	3
4	1998-01-18	16:00	1.2	1	090	0	3
5	1998-01-18	20:00	0.5	1	090	0	3

STATION	DATE	TIME	TEMPERATURE (°C)	WIND SPEED (km/h)	WIND DIRECTION	RELATIVE HUMIDITY (%)	SEA STATE
1	1998-01-18	24:00	0.0	1	090	0	3
2	1998-01-19	00:00	-0.5	1	090	0	3
3	1998-01-19	04:00	-1.2	1	090	0	3
4	1998-01-19	08:00	-1.8	1	090	0	3
5	1998-01-19	12:00	-2.5	1	090	0	3

Sample Type: Quality Control

SITE CODE	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK	D.I. BLANK
SAMPLE DATE	05/22/93	12/15/93	04/07/94	08/25/94	11/18/94
SAMPLE TIME	18:00	13:00	17:20	11:00	12:45
LAB	EL	EL	EL	EL	EL
LAB NUMBER	93-20281	93-59624	94-13580	94-40383	94-58164
REMARKS	RINSEBLANK	BLANK		BLANK	BLANK
SAMPLE NUMBER	HL-9305-111	HL-9312-107	HL-9404-109	HL-9408-107	HL-9411-115

-- OTHER PARAMETERS --

ENDOSULFAN SULFATE			<0.0001		
ENDRIN			<0.0001		
ENDRIN ALDEHYDE			<0.0001		
ENDRIN KETONE			<0.0001		
GAMMA-BHC (LINDANE)			<0.00005		
HEPTACHLOR			<0.00005		
HEPTACHLOR EPOXIDE			<0.00005		
METHOXYCHLOR			<0.0005		
PRONAMIDE			<0.01		
SULFIDE AS S			<0.04		
CHEMICAL OXYGEN DEMAND	<1.0	<1.0			<1.0
TOXAPHENE			<0.005		

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ANNUAL REPORT

1911	1912	1913	1914	1915	1916
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DEPARTMENT OF AGRICULTURE

UNITED STATES DEPARTMENT OF AGRICULTURE
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Sample Type: Quality Control

SITE CODE	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK
SAMPLE DATE	05/19/92	11/16/92	12/15/93	12/16/93	08/24/94	11/18/94
SAMPLE TIME	14:00	15:35	15:15	09:10	14:30	13:40
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-19271	92-49144	93-59625	93-59627	94-40105	94-58165
REMARKS		BLANK	BLANK	BLANK	BLANK	BLANK
SAMPLE NUMBER	HL-9205-107	HL-9211-103	HL-9312-108	HL-9312-109	HL-9408-115	HL-9411-116

-- PHYSICAL PARAMETERS --

PH	6.5	5.6	5.9	5.8		5.8
SC (UMHOS/CM AT 25 C)	11.0	2.0	2.0	3.0		1.0
TDS (MEASURED AT 180 C)	<1.0	3.0				
TOTAL SUSPENDED SOLIDS	<1.0	<1.0				

-- MAJOR CONSTITUENTS --

CALCIUM (CA) DIS	<1.0	<1.0				
MAGNESIUM (MG) DIS	<1.0	<1.0				
SODIUM (NA) DIS	<1.0	<1.0				
POTASSIUM (K) DIS	<1.0	<1.0				
TOTAL ALKALINITY AS CaCO3	5.0	1.0				
BICARBONATE (HCO3)	6.0	2.0				
CARBONATE AS CO3	0.0	0.0				
SULFATE (SO4)	<1.0	<1.0	<1.0	<1.0		<1.0
CHLORIDE (CL)	<1.0	<1.0	<1.0	<1.0		<1.0

-- NUTRIENTS --

AMMONIA (NH3 AS N)	<0.1	<0.1				
NITRATE (NO3-N)	<0.05	<0.05	<0.05	<0.05		
NITRATE + NITRITE AS N						<0.05

-- METALS & MINOR CONSTITUENTS --

ANTIMONY (SB) DIS			<0.05	<0.05		<0.05
ARSENIC (AS) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
BARIUM (BA) DIS	<0.1	<0.1	<0.1	<0.1		<0.1
BERYLLIUM (BE) DIS			<0.001	<0.001		<0.001
CADMIUM (CD) DIS	<0.001	<0.001	<0.001	<0.001		<0.001
CHROMIUM (CR) DIS	<0.01	<0.01	<0.01	<0.01		<0.01
COBALT (CO) DIS			<0.01	<0.01		<0.01
COPPER (CU) DIS			<0.01	<0.01		<0.01
IRON (FE) DIS	<0.03	<0.03	<0.03	<0.03		<0.03
LEAD (PB) DIS	<0.01	<0.01	<0.01	<0.01		<0.01
MANGANESE (MN) DIS	<0.02	<0.02				
MERCURY (HG) DIS	<0.001	<0.001	<0.001	<0.001		<0.001
NICKEL (NI) DIS			<0.01	<0.01		<0.01
SELENIUM (SE) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
SILVER (AG) DIS	<0.005	<0.005	<0.005	<0.005		<0.005
THALLIUM (TL) DIS			<0.1	<0.1		<0.1
VANADIUM (V) DIS			<0.1	<0.1		<0.1
ZINC (ZN) DIS			0.01	0.01		<0.01

-- VOLATILE ORGANICS --

1,1,1,2-TETRACHLOROETHANE			<0.001	<0.001	<0.001	<0.001
1,1,1-TRICHLOROETHANE	0.00054	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2,2-TETRACHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TRICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DICHLOROETHENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMOETHANE			<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROETHANE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROPROPANE			<0.001	<0.001	<0.001	<0.001
2-CHLOROETHYL VINYL ETHER	<0.01	<0.001				
2-HEXANONE			<0.02	<0.02	<0.02	<0.02
4-BROMOFLUOROBENZENE	<0.01	<0.01				
ACETONE			<0.02	<0.02	<0.05	<0.05
ACRYLONITRILE			<0.02	<0.02	<0.02	<0.02

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)

TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

STATION	DATE	TIME	WIND DIRECTION	WIND SPEED	WAVE DIRECTION	WAVE PERIOD
1	10/10/60	10:00	090	10	090	10
2	10/10/60	11:00	090	12	090	12
3	10/10/60	12:00	090	15	090	15
4	10/10/60	13:00	090	18	090	18
5	10/10/60	14:00	090	20	090	20
6	10/10/60	15:00	090	22	090	22
7	10/10/60	16:00	090	25	090	25
8	10/10/60	17:00	090	28	090	28
9	10/10/60	18:00	090	30	090	30
10	10/10/60	19:00	090	32	090	32
11	10/10/60	20:00	090	35	090	35
12	10/10/60	21:00	090	38	090	38
13	10/10/60	22:00	090	40	090	40
14	10/10/60	23:00	090	42	090	42
15	10/10/60	00:00	090	45	090	45
16	10/10/60	01:00	090	48	090	48
17	10/10/60	02:00	090	50	090	50
18	10/10/60	03:00	090	52	090	52
19	10/10/60	04:00	090	55	090	55
20	10/10/60	05:00	090	58	090	58
21	10/10/60	06:00	090	60	090	60
22	10/10/60	07:00	090	62	090	62
23	10/10/60	08:00	090	65	090	65
24	10/10/60	09:00	090	68	090	68
25	10/10/60	10:00	090	70	090	70
26	10/10/60	11:00	090	72	090	72
27	10/10/60	12:00	090	75	090	75
28	10/10/60	13:00	090	78	090	78
29	10/10/60	14:00	090	80	090	80
30	10/10/60	15:00	090	82	090	82
31	10/10/60	16:00	090	85	090	85
32	10/10/60	17:00	090	88	090	88
33	10/10/60	18:00	090	90	090	90
34	10/10/60	19:00	090	92	090	92
35	10/10/60	20:00	090	95	090	95
36	10/10/60	21:00	090	98	090	98
37	10/10/60	22:00	090	100	090	100
38	10/10/60	23:00	090	102	090	102
39	10/10/60	00:00	090	105	090	105
40	10/10/60	01:00	090	108	090	108
41	10/10/60	02:00	090	110	090	110
42	10/10/60	03:00	090	112	090	112
43	10/10/60	04:00	090	115	090	115
44	10/10/60	05:00	090	118	090	118
45	10/10/60	06:00	090	120	090	120
46	10/10/60	07:00	090	122	090	122
47	10/10/60	08:00	090	125	090	125
48	10/10/60	09:00	090	128	090	128
49	10/10/60	10:00	090	130	090	130
50	10/10/60	11:00	090	132	090	132
51	10/10/60	12:00	090	135	090	135
52	10/10/60	13:00	090	138	090	138
53	10/10/60	14:00	090	140	090	140
54	10/10/60	15:00	090	142	090	142
55	10/10/60	16:00	090	145	090	145
56	10/10/60	17:00	090	148	090	148
57	10/10/60	18:00	090	150	090	150
58	10/10/60	19:00	090	152	090	152
59	10/10/60	20:00	090	155	090	155
60	10/10/60	21:00	090	158	090	158
61	10/10/60	22:00	090	160	090	160
62	10/10/60	23:00	090	162	090	162
63	10/10/60	00:00	090	165	090	165
64	10/10/60	01:00	090	168	090	168
65	10/10/60	02:00	090	170	090	170
66	10/10/60	03:00	090	172	090	172
67	10/10/60	04:00	090	175	090	175
68	10/10/60	05:00	090	178	090	178
69	10/10/60	06:00	090	180	090	180
70	10/10/60	07:00	090	182	090	182
71	10/10/60	08:00	090	185	090	185
72	10/10/60	09:00	090	188	090	188
73	10/10/60	10:00	090	190	090	190
74	10/10/60	11:00	090	192	090	192
75	10/10/60	12:00	090	195	090	195
76	10/10/60	13:00	090	198	090	198
77	10/10/60	14:00	090	200	090	200
78	10/10/60	15:00	090	202	090	202
79	10/10/60	16:00	090	205	090	205
80	10/10/60	17:00	090	208	090	208
81	10/10/60	18:00	090	210	090	210
82	10/10/60	19:00	090	212	090	212
83	10/10/60	20:00	090	215	090	215
84	10/10/60	21:00	090	218	090	218
85	10/10/60	22:00	090	220	090	220
86	10/10/60	23:00	090	222	090	222
87	10/10/60	00:00	090	225	090	225
88	10/10/60	01:00	090	228	090	228
89	10/10/60	02:00	090	230	090	230
90	10/10/60	03:00	090	232	090	232
91	10/10/60	04:00	090	235	090	235
92	10/10/60	05:00	090	238	090	238
93	10/10/60	06:00	090	240	090	240
94	10/10/60	07:00	090	242	090	242
95	10/10/60	08:00	090	245	090	245
96	10/10/60	09:00	090	248	090	248
97	10/10/60	10:00	090	250	090	250
98	10/10/60	11:00	090	252	090	252
99	10/10/60	12:00	090	255	090	255
100	10/10/60	13:00	090	258	090	258

Sample Type: Quality Control

SITE CODE	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK	RINSBLANK
SAMPLE DATE	05/19/92	11/16/92	12/15/93	12/16/93	08/24/94	11/18/94
SAMPLE TIME	14:00	15:35	15:15	09:10	14:30	13:40
LAB	EL	EL	EL	EL	EL	EL
LAB NUMBER	92-19271	92-49144	93-59625	93-59627	94-40105	94-58165
REMARKS		BLANK	BLANK	BLANK	BLANK	BLANK
SAMPLE NUMBER	HL-9205-107	HL-9211-103	HL-9312-108	HL-9312-109	HL-9408-115	HL-9411-116

-- VOLATILE ORGANICS --

BENZENE	0.00058	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMODICHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CARBON DISULFIDE			<0.001	<0.001	<0.001	<0.001
CARBON TETRACHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROFORM	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CIS-1,2-DICHLOROETHENE			<0.001	<0.001	<0.001	<0.001
CIS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOCHLOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DIBROMOMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DICHLORODIFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ETHYL METHACRYLATE	<0.01	<0.001				
ETHYLBENZENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
IODOMETHANE	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL XYLENE	<0.001	<0.001				
M-P XYLENE			<0.001	<0.001		
O-XYLENE			<0.001	<0.001	<0.001	<0.001
METHYL ETHYL KETONE					<0.02	
METHYL ETHYL KETONE			<0.02	<0.02		<0.02
METHYL ISOBUTYL KETONE			<0.02	<0.02	<0.02	<0.02
METHYLENE CHLORIDE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
STYRENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TETRACHLOROETHENE	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOLUENE	0.0023	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,2-DICHLOROETHENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRANS-1,3-DICHLOROPROPENE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROETHENE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
TRICHLOROFLUOROMETHANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
VINYL ACETATE	<0.01	<0.02	<0.001	<0.001	<0.001	<0.001
VINYL CHLORIDE	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001

-- SEMI-VOLATILE EXTRACTABLES --

1,2,3-TRICHLOROPROPANE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DIBROMO-3-CHLOROPROPANE			<0.001	<0.001	<0.001	<0.001
1,2-DICHLOROBENZENE			<0.001	<0.001	<0.001	<0.001
TRANS-1,4-DICHLORO-2-BUTENE			<0.002	<0.002	<0.002	<0.002
1,4-DICHLOROBENZENE			<0.001	<0.001	<0.001	<0.001
1,4-DIFLUOROBENZENE	<0.01	<0.001				
NAPHTHALENE			<0.001	<0.001		

-- HYDROCARBONS --

M+P-XYLENE					<0.001	<0.001
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-- OTHER PARAMETERS --

CYANIDE (CN) TOT	<0.005	<0.005	<0.005	<0.005		<0.005
CHEMICAL OXYGEN DEMAND	10.0	<1.0	<1.0	<1.0		3.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; A:Anomalous Data; <:Less Than Detect. Blank indicates parameter not tested.

WATER RESOURCES

STATE	WATER RESOURCES	WATER RESOURCES	WATER RESOURCES	WATER RESOURCES	WATER RESOURCES	WATER RESOURCES
ALABAMA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
ALASKA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
ARIZONA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
ARKANSAS	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
CALIFORNIA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
COLORADO	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
CONNECTICUT	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
DELAWARE	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
FLORIDA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
GEORGIA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
HAWAII	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
IDAHO	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
ILLINOIS	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
INDIANA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
IOWA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
KANSAS	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
KENTUCKY	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
Louisiana	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MAINE	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MARYLAND	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MASSACHUSETTS	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MICHIGAN	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MINNESOTA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MISSISSIPPI	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MISSOURI	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
MONTANA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEBRASKA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEVADA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEW HAMPSHIRE	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEW JERSEY	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEW MEXICO	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NEW YORK	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NORTH CAROLINA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
NORTH DAKOTA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
OHIO	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
OKLAHOMA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
OREGON	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
PENNSYLVANIA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
RHODE ISLAND	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
SOUTH CAROLINA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
SOUTH DAKOTA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
TENNESSEE	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
TEXAS	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
UTAH	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
VERMONT	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
VIRGINIA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
WASHINGTON	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
WEST VIRGINIA	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
WISCONSIN	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000
WYOMING	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000	1,000,000,000

APPENDIX A: WATER QUALITY ANALYSES SUMMARY REPORT (1989 THROUGH 1994)

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
97	5	Colvin	Private Well		
99	9	9	Private Well		
101	13	Johnson/Oakwood	Private Well		
105	19	19	Private Well		
107	20	20	Private Well		
109	23	23	Private Well		
111	26	26	Private Well		
113	28	Johnson/Peosta	Private Well		
115	31	Gardner	Private Well		
118	32	32	Private Well		
120	34	34	Private Well		
122	36	36	Private Well		
124	38	38	Private Well		
126	40	Hartman	Private Well		
130	42	42	Private Well		
132	45	HANSEN (OAKWOOD)	Private Well		
134	47	47	Private Well		
135	48	48	Private Well		
137	51	Hartze	Private Well		
139	52	52	Private Well		
141	57	Gwen Francis	Private Well		
142	59	Stolp	Private Well		
145	62	Elton Hartze	Private Well		
146	67	67	Private Well		
148	68	68	Private Well		
149	75	Creach	Private Well		
9	82-2	82-2	Monitoring Wells		24.0
11	82-3	82-3	Monitoring Wells		87
12	82-4	82-4	Monitoring Wells		79.0
15	83-5	83-5	Monitoring Wells		
16	83-6	83-6	Monitoring Wells	3990.86	23.0
24	83-7	83-7	Monitoring Wells		40.0
151	84	SPENCER	Private Well		
153	87	Peterson	Private Well		
154	92	Ray Rowsey	Private Well		
155	93	R.A. HECHT - 932 ASPEN	Private Well		
156	96	ED MCHUGH (#2 PUMP HOUSE SW OF MCHUGH TRAILER CRT	Private Well		
157	BLANK	BLANK	Quality Control		
159	D.I. BLANK	D.I. BLANK	Quality Control		
26	EPA-1	EPA-1	Monitoring Wells	3986.00	59
34	FAIR GRND	FAIRGROUND-CITY WATER	Monitoring Wells		
36	HL-1	HL-1	Monitoring Wells		20.0
38	HL-2	HL-2	Monitoring Wells		30
39	HL-3	HL-3	Monitoring Wells		
40	HL-5	HL-5	Monitoring Wells		31.44
42	HL-6	HL-6	Monitoring Wells		
44	HL-7	HL-7	Monitoring Wells		18.0
46	HL-90-1	HL-90-1	Monitoring Wells	3942.48	68.0
56	HL-90-2	HL-90-2	Monitoring Wells	3950.96	68
68	HL-90-3	HL-90-3	Monitoring Wells	3958.29	79
76	HL-94-1	HL-94-1	Monitoring Wells		
81	HL-94-2	HL-94-2	Monitoring Wells		
86	HL-94-3	HL-94-3	Monitoring Wells		
1	I-1	HL-I1	Irrigation Well		
3	I-2	HL-I2	Irrigation Well		
5	I-3	GOLF COURSE WELL #3	Irrigation Well		
7	INF.GALLERY	HL-IF1	Irrigation Well		
88	MPC-HL-1	MPC-HL-1	Monitoring Wells		
94	MPC-HL-2	MPC-HL-2	Monitoring Wells		
165	RINSBLANK	RINSATE BLANK	Quality Control		

APPENDIX A: WATER QUALITY ANALYSES SUMMARY REPORT (1989 THROUGH 1994)

INDEX

SAMPLE NUMBER ORDER					LAB NUMBER ORDER				
Page	Sample Number	Lab ##	Date	Site Code	Page	Lab ##	Sample Number	Date	Site Code
135	HL-0690-200	90-14925	06/01/90	48	11		HL-8911-904	11/13/89	82-3
137	HL-0690-201	90-14926	06/01/90	51	15		HL-8911-901	11/13/89	83-5
142	HL-0690-202	90-14927	06/01/90	59	16		HL-8911-900	11/13/89	83-6
146	HL-0690-203	90-14928	06/01/90	67	38		HL-8911-902	11/13/89	HL-2
146	HL-0690-204	90-14929	06/01/90	67	39		HL-8911-903	11/13/89	HL-3
113	HL-1	93-21821	05/25/93	28	40		HL-8911-905	11/13/89	HL-5
137	HL-1	94-16462	04/18/94	51	94		HL-9211-107	11/19/92	MPC-HL-2
126	HL-10	93-21829	05/28/93	40	151		HL-9408-109	08/25/94	84
126	HL-10	94-16471	04/18/94	40	3		HL-9411-110	11/21/94	I-2
149	HL-104C4	94-3396	01/04/94	75	5		HL-9411-111	11/21/94	I-3
139	HL-104E5	94-3393	01/04/94	52	24		HL-9411-101	11/21/94	83-7
115	HL-104G6	94-3395	01/04/94	31	128		HL-9412-102	12/08/94	40
126	HL-104H2	94-3391	01/04/94	40	149		HL-9412-106	12/08/94	75
103	HL-104J1	94-3392	01/04/94	13	154		HL-9412-107	12/08/94	92
142	HL-104S3	94-3394	01/04/94	59	12	89-20180	HL-8911-001	11/11/89	82-4
97	HL-105C1	94-3538	01/05/94	5	9	89-20181	HL-8911-002	11/11/89	82-2
115	HL-11	93-21830	05/28/93	31	44	89-20182	HL-8911-003	11/11/89	HL-7
103	HL-2	94-16463	04/18/94	13	24	89-20183	HL-8911-004	11/11/89	83-7
132	HL-3	94-16464	04/18/94	45	157	89-20184	HL-8911-005	11/11/89	BLANK
139	HL-3	93-21822	05/26/93	52	36	89-20185	HL-8911-006	11/13/89	HL-1
139	HL-4	93-21823	05/26/93	52	111	90-10817	HL-9005-100	05/03/90	26
144	HL-4	94-16465	04/18/94	59	118	90-10818	HL-9005-101	05/03/90	32
142	HL-5	93-21824	05/26/93	59	130	90-10819	HL-9005-102	05/03/90	42
149	HL-5	94-16466	04/18/94	75	115	90-10820	HL-9005-103	05/03/90	31
101	HL-6	93-21825	05/26/93	13	124	90-10821	HL-9005-104	05/03/90	38
117	HL-6	94-16467	04/18/94	31	101	90-10822	HL-9005-105	05/04/90	13
113	HL-7	94-16468	04/18/94	28	105	90-10823	HL-9005-106	05/04/90	19
149	HL-7	93-21826	05/26/93	75	120	90-10824	HL-9005-107	05/06/90	34
97	HL-8	93-21827	11/11/93	5	107	90-10825	HL-9005-108	05/06/90	20
151	HL-8	94-16469	04/18/94	84	109	90-10826	HL-9005-109	05/06/90	23
12	HL-8911-001	89-20180	11/11/89	82-4	36	90-10827	HL-9005-110	05/06/90	HL-1
9	HL-8911-002	89-20181	11/11/89	82-2	40	90-10829	HL-9005-112	05/06/90	HL-5
44	HL-8911-003	89-20182	11/11/89	HL-7	42	90-10830	HL-9005-113	05/06/90	HL-6
24	HL-8911-004	89-20183	11/11/89	83-7	126	90-10831	HL-9005-114	05/06/90	40
157	HL-8911-005	89-20184	11/11/89	BLANK	157	90-10832	HL-9005-115	05/07/90	BLANK
36	HL-8911-006	89-20185	11/13/89	HL-1	124	90-10833	HL-9005-204	05/03/90	38
16	HL-8911-900		11/13/89	83-6	5	90-12196	HL-9005-116	05/08/90	I-3
15	HL-8911-901		11/13/89	83-5	56	90-12197	HL-9005-120	05/10/90	HL-90-2
38	HL-8911-902		11/13/89	HL-2	46	90-12198	HL-9005-121	05/11/90	HL-90-1
39	HL-8911-903		11/13/89	HL-3	12	90-12199	HL-9005-122	05/11/90	82-4
11	HL-8911-904		11/13/89	82-3	135	90-14925	HL-0690-200	06/01/90	48
40	HL-8911-905		11/13/89	HL-5	137	90-14926	HL-0690-201	06/01/90	51
97	HL-9	94-16470	04/18/94	5	142	90-14927	HL-0690-202	06/01/90	59
153	HL-9	93-21828	05/28/93	87	146	90-14928	HL-0690-203	06/01/90	67
101	HL-90-10	90-3298	02/16/90	13	146	90-14929	HL-0690-204	06/01/90	67
68	HL-90-2-100	90-2765	02/02/90	HL-90-3	113	90-15038	HL-9006-100	06/05/90	28
111	HL-9005-100	90-10817	05/03/90	26	34	90-15039	HL-9006-101	06/05/90	FAIR GRND
118	HL-9005-101	90-10818	05/03/90	32	122	90-15040	HL-9006-102	06/05/90	36
130	HL-9005-102	90-10819	05/03/90	42	99	90-15042	HL-9006-104	06/06/90	9
115	HL-9005-103	90-10820	05/03/90	31	151	90-15044	HL-9006-106	06/06/90	84
124	HL-9005-104	90-10821	05/03/90	38	68	90-2765	HL-90-2-100	02/02/90	HL-90-3
101	HL-9005-105	90-10822	05/04/90	13	46	90-2766	HL90-2-101	02/02/90	HL-90-1
105	HL-9005-106	90-10823	05/04/90	19	56	90-2767	HL90-2-102	02/03/90	HL-90-2
120	HL-9005-107	90-10824	05/06/90	34	101	90-3298	HL-90-10	02/16/90	13
107	HL-9005-108	90-10825	05/06/90	20	101	91-12763	HL-9104-100	04/04/91	13
109	HL-9005-109	90-10826	05/06/90	23	148	91-12764	HL-9104-101	04/04/91	68
36	HL-9005-110	90-10827	05/06/90	HL-1	139	91-12765	HL-9104-102	04/04/91	52
40	HL-9005-112	90-10829	05/06/90	HL-5	142	91-12766	HL-9104-103	04/04/91	59
42	HL-9005-113	90-10830	05/06/90	HL-6	56	91-12767	HL-9104-104	04/04/91	HL-90-2
126	HL-9005-114	90-10831	05/06/90	40	26	91-12768	HL-9104-105	04/05/91	EPA-1
157	HL-9005-115	90-10832	05/07/90	BLANK	16	91-12769	HL-9104-106	04/05/91	83-6
5	HL-9005-116	90-12196	05/08/90	I-3	68	91-12770	HL-9104-107	04/05/91	HL-90-3
56	HL-9005-120	90-12197	05/10/90	HL-90-2	46	91-12771	HL-9104-108	04/05/91	HL-90-1
46	HL-9005-121	90-12198	05/11/90	HL-90-1	46	91-12772	HL-9104-118	04/05/91	HL-90-1
12	HL-9005-122	90-12199	05/11/90	82-4	126	91-13086	HL-9104-109	04/13/91	40
124	HL-9005-204	90-10833	05/03/90	38	97	91-13087	HL-9104-110	04/13/91	5
113	HL-9006-100	90-15038	06/05/90	28	115	91-13088	HL-9104-111	04/13/91	31
34	HL-9006-101	90-15039	06/05/90	FAIR GRND	88	92-16654	MPC-9205-101	05/06/92	MPC-HL-1
122	HL-9006-102	90-15040	06/05/90	36	94	92-16655	MPC-9205-102	05/06/92	MPC-HL-2

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151	HL-9006-106	90-15044	06/06/90	84	46	92-19270	HL-9205-122	05/19/92	HL-90-1
101	HL-9104-100	91-12763	04/04/91	13	165	92-19271	HL-9205-107	05/19/92	RINSEBLANK
148	HL-9104-101	91-12764	04/04/91	68	56	92-19272	HL-9205-101	05/19/92	HL-90-2
139	HL-9104-102	91-12765	04/04/91	52	56	92-19273	HL-9205-119	05/19/92	HL-90-2
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56	HL-9104-104	91-12767	04/04/91	HL-90-2	26	92-19275	HL-9205-123	05/20/92	EPA-1
26	HL-9104-105	91-12768	04/05/91	EPA-1	101	92-19276	HL-9205-105	05/20/92	13
16	HL-9104-106	91-12769	04/05/91	83-6	142	92-19277	HL-9205-102	05/20/92	59
68	HL-9104-107	91-12770	04/05/91	HL-90-3	149	92-19278	HL-9205-100	05/20/92	75
46	HL-9104-108	91-12771	04/05/91	HL-90-1	135	92-19279	HL-9205-110	05/20/92	48
126	HL-9104-109	91-13086	04/13/91	40	126	92-19787	HL-9205-118	05/28/92	40
97	HL-9104-110	91-13087	04/13/91	5	115	92-19788	HL-9205-112	05/28/92	31
115	HL-9104-111	91-13088	04/13/91	31	139	92-19789	HL-9205-114	05/28/92	52
46	HL-9104-118	91-12772	04/05/91	HL-90-1	68	92-4683	HL-9201-100	01/21/92	HL-90-3
68	HL-9201-100	92-4683	01/21/92	HL-90-3	46	92-4684	HL-9201-101	01/21/92	HL-90-1
46	HL-9201-101	92-4684	01/21/92	HL-90-1	157	92-4685	HL-9201-102	01/22/92	BLANK
157	HL-9201-102	92-4685	01/22/92	BLANK	56	92-4686	HL-9201-104	01/22/92	HL-90-2
26	HL-9201-103	92-4687	01/22/92	EPA-1	26	92-4687	HL-9201-103	01/22/92	EPA-1
56	HL-9201-104	92-4686	01/22/92	HL-90-2	142	92-4688	HL-9201-105	01/22/92	59
142	HL-9201-105	92-4688	01/22/92	59	134	92-4689	HL-9201-106	01/22/92	47
134	HL-9201-106	92-4689	01/22/92	47	149	92-4690	HL-9201-107	01/22/92	75
149	HL-9201-107	92-4690	01/22/92	75	124	92-4691	HL-9201-108	01/22/92	38
124	HL-9201-108	92-4691	01/22/92	38	101	92-4692	HL-9201-109	01/22/92	13
101	HL-9201-109	92-4692	01/22/92	13	16	92-49141	HL-9211-100	11/16/92	83-6
115	HL-9201-110	92-5002	01/29/92	31	68	92-49142	HL-9211-101	11/16/92	HL-90-3
16	HL-9201-111	92-5001	01/31/92	83-6	46	92-49143	HL-9211-102	11/16/92	HL-90-1
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142	HL-9205-102	92-19277	05/20/92	59	60	92-49146	HL-9211-105	11/16/92	HL-90-2
16	HL-9205-103	92-19274	05/19/92	83-6	26	92-49147	HL-9211-106	11/17/92	EPA-1
101	HL-9205-105	92-19276	05/20/92	13	88	92-49148	HL-9211-108	11/19/92	MPC-HL-1
165	HL-9205-107	92-19271	05/19/92	RINSEBLANK	16	92-5001	HL-9201-111	01/31/92	83-6
68	HL-9205-109	92-19269	05/19/92	HL-90-3	115	92-5002	HL-9201-110	01/29/92	31
135	HL-9205-110	92-19279	05/20/92	48	139	92-50581	HL-9212-900	12/01/92	52
115	HL-9205-112	92-19788	05/28/92	31	139	92-50582	HL-9212-901	12/01/92	52
139	HL-9205-114	92-19789	05/28/92	52	142	92-50583	HL-9212-902	12/01/92	59
126	HL-9205-118	92-19787	05/28/92	40	101	92-50584	HL-9212-903	12/01/92	13
56	HL-9205-119	92-19273	05/19/92	HL-90-2	149	92-50585	HL-9212-904	12/01/92	75
46	HL-9205-122	92-19270	05/19/92	HL-90-1	126	92-50586	HL-9212-905	12/02/92	40
26	HL-9205-123	92-19275	05/20/92	EPA-1	97	92-50587	HL-9212-906	12/02/92	5
16	HL-9211-100	92-49141	11/16/92	83-6	115	92-50588	HL-9212-907	12/02/92	31
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46	HL-9211-102	92-49143	11/16/92	HL-90-1	50	93-20280	HL-9305-102	05/22/93	HL-90-1
165	HL-9211-103	92-49144	11/16/92	RINSEBLANK	159	93-20281	HL-9305-111	05/22/93	D.I. BLANK
56	HL-9211-104	92-49145	11/16/92	HL-90-2	50	93-20282	HL-9305-112	05/22/93	HL-90-1
60	HL-9211-105	92-49146	11/16/92	HL-90-2	68	93-20283	HL-9305-104	05/22/93	HL-90-3
26	HL-9211-106	92-49147	11/17/92	EPA-1	16	93-20284	HL-9305-100	05/22/93	83-6
94	HL-9211-107		11/19/92	MPC-HL-2	26	93-20448	HL-9305-101	05/25/93	EPA-1
88	HL-9211-108	92-49148	11/19/92	MPC-HL-1	94	93-20449	HL-9305-106	05/27/93	MPC-HL-2
139	HL-9212-900	92-50581	12/01/92	52	88	93-20450	HL-9305-105	05/27/93	MPC-HL-1
139	HL-9212-901	92-50582	12/01/92	52	113	93-21821	HL-1	05/25/93	28
142	HL-9212-902	92-50583	12/01/92	59	139	93-21822	HL-3	05/26/93	52
101	HL-9212-903	92-50584	12/01/92	13	139	93-21823	HL-4	05/26/93	52
149	HL-9212-904	92-50585	12/01/92	75	142	93-21824	HL-5	05/26/93	59
126	HL-9212-905	92-50586	12/02/92	40	101	93-21825	HL-6	05/26/93	13
97	HL-9212-906	92-50587	12/02/92	5	149	93-21826	HL-7	05/26/93	75
115	HL-9212-907	92-50588	12/02/92	31	97	93-21827	HL-8	11/11/93	5
16	HL-9305-100	93-20284	05/22/93	83-6	153	93-21828	HL-9	05/28/93	87
26	HL-9305-101	93-20448	05/25/93	EPA-1	126	93-21829	HL-10	05/28/93	40
50	HL-9305-102	93-20280	05/22/93	HL-90-1	115	93-21830	HL-11	05/28/93	31
60	HL-9305-103	93-20279	05/22/93	HL-90-2	16	93-59620	HL-9312-100	12/15/93	83-6
68	HL-9305-104	93-20283	05/22/93	HL-90-3	26	93-59621	HL-9312-101	12/15/93	EPA-1
88	HL-9305-105	93-20450	05/27/93	MPC-HL-1	50	93-59622	HL-9312-102	12/15/93	HL-90-1
94	HL-9305-106	93-20449	05/27/93	MPC-HL-2	68	93-59623	HL-9312-104	12/15/93	HL-90-3
159	HL-9305-111	93-20281	05/22/93	D.I. BLANK	159	93-59624	HL-9312-107	12/15/93	D.I. BLANK
50	HL-9305-112	93-20282	05/22/93	HL-90-1	165	93-59625	HL-9312-108	12/15/93	RINSEBLANK
16	HL-9312-100	93-59620	12/15/93	83-6	60	93-59626	HL-9312-103	12/16/93	HL-90-2
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60	HL-9312-110	93-59628	12/16/93	HL-90-2	76	94-13576	HL-9404-105	04/08/94	HL-94-1
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26	HL-9404-101	94-13572	04/08/94	EPA-1	88	94-13578	HL-9404-107	04/08/94	MPC-HL-1
50	HL-9404-102	94-13573	04/08/94	HL-90-1	60	94-13579	HL-9404-108	04/07/94	HL-90-2
60	HL-9404-103	94-13574	04/07/94	HL-90-2	159	94-13580	HL-9404-109	04/07/94	D.I. BLANK
71	HL-9404-104	94-13575	04/07/94	HL-90-3	137	94-16462	HL-1	04/18/94	51
76	HL-9404-105	94-13576	04/08/94	HL-94-1	103	94-16463	HL-2	04/07/94	HL-90-2
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71	HL-9411-105	94-58158	11/18/94	HL-90-3	165	94-40105	HL-9408-115	08/24/94	RINSBLANK
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81	HL-9411-107	94-58160	11/18/94	HL-94-2	5	94-40379	HL-9408-108	08/25/94	I-3
86	HL-9411-108	94-58161	11/18/94	HL-94-3	3	94-40380	HL-9408-114	08/25/94	I-2
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7	HL-9411-112	94-58167	11/21/94	INF.GALLERY	132	94-40762	HL-9408-111	08/25/94	45
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165	HL-9411-116	94-58165	11/18/94	RINSBLANK	50	94-58156	HL-9411-103	11/18/94	HL-90-1
103	HL-9412-100	94-60430	12/08/94	13	66	94-58157	HL-9411-104	11/18/94	HL-90-2
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128	HL-9412-102		12/08/94	40	76	94-58159	HL-9411-106	11/18/94	HL-94-1
141	HL-9412-103	94-60432	12/08/94	57	81	94-58160	HL-9411-107	11/18/94	HL-94-2
97	HL-9412-104	94-60433	12/08/94	5	86	94-58161	HL-9411-108	11/18/94	HL-94-3
145	HL-9412-105	94-60434	12/08/94	62	88	94-58162	HL-9411-113	11/21/94	MPC-HL-1
149	HL-9412-106		12/08/94	75	86	94-58163	HL-9411-114	11/18/94	HL-94-3
154	HL-9412-107		12/08/94	92	159	94-58164	HL-9411-115	11/18/94	D.I. BLANK
156	HL-9412-108	94-60435	12/08/94	96	165	94-58165	HL-9411-116	11/18/94	RINSBLANK
151	HL-9412-109	94-60436	12/08/94	84	1	94-58166	HL-9411-109	11/21/94	I-1
155	HL-9412-110	94-61429	12/20/94	93	7	94-58167	HL-9411-112	11/21/94	INF.GALLERY
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3	HLI2	94-16831	04/21/94	I-2
5	HLI3	94-16832	04/21/94	I-3
88	MPC-9205-101	92-16654	05/06/92	MPC-HL-1
94	MPC-9205-102	92-16655	05/06/92	MPC-HL-2

+----- LAB NUMBER ORDER -----+				
Page	Lab ##	Sample Number	Date	Site Code
156	94-60435	HL-9412-108	12/08/94	96
151	94-60436	HL-9412-109	12/08/94	84
155	94-61429	HL-9412-110	12/20/94	93
94	94-61430	HL-9412-111	12/20/94	MPC-HL-2

